

**Final Report      924577**  
**for Remediation of**  
**Locations in Granite**  
**City, Madison and**  
**Venice, Illinois,**  
**Associated with NL**  
**Industries/Taracorp**  
**Superfund Site**

Submitted to:  
United States Army Corps of  
Engineers  
Omaha, Nebraska

Submitted by:  
OHM Remediation Services Corp.

May 19, 1995

**FINAL REPORT FOR REMEDIATION OF  
LOCATIONS IN GRANITE CITY, MADISON  
AND VENICE, ILLINOIS, ASSOCIATED  
WITH NL INDUSTRIES/TARACORP  
SUPERFUND SITE**

**Rapid Response Contract No. DACW45-89-D-0516  
Delivery Order No. 58**

*Submitted to:*

*United States Army Corp. of Engineers  
Omaha, Nebraska*

*Submitted by:*



*OHM Remediation Services Corp.  
Midwest Region*

*March 27, 1996  
Project 13407.2*

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## CORPS OF ENGINEERS ENGINEERING REVIEW COMMENTS

Reference	Item Number	Corps Comments	OHM's Response
1-2	1.2.1	Phase 1 work, indicate that alleyways were not a clean closure at that time. They were capped by paving them.	This has been revised.
1-2	1.2.1	Spelling errors: Third line, excavatin should be excavating. Sixth line saving should be paving.	This has been corrected.
2-2	2.3	Site personnel were initially mobilized from other offices rather than from the O'Fallon office. As a cost saving measure and at the insistance of USACE personnel the O'Fallon office was eventually used to staff the project. Reword this paragraph to be more accurate.	This has been revised.
3-2	3.1.2	Describe the methodology used to determine the margin of error factor (370 mg/kg) used for the screening process.	This has been revised.
3-7	3.2.5	Last sentence indicates that the integrity of the samples were compromised. In what way? Explain.	This has been revised.
4-2	4.3	See comment 3 above.	This has been revised.
4-2	4.3.1	Last line: "sod, savings alleys," should read "pad, paving alleys,"	This has been corrected.
4-6	4.5.2	Fourth paragraph, indicates that the wastes were segregated "according to the Woodward-Clyde report." This is not correct. Waste was classified visually (the presence of battery chips classified the material as haz.) or by analysis if no chips visible.	This has been revised.

## CORPS OF ENGINEERS ENGINEERING REVIEW COMMENTS

Reference	Item Number	Corps Comments	OHM's Response
5-1	5.0	Third paragraph, the first sentence is not clear, "...because OHM as directed by USACE." Please reword.	This has been deleted.
6-1	6.1.1	Fifth bullet, second line, change "implemented" to "upgraded"	This has been added.
6-1	6.1.1	Seventh (last) bullet, list the four levels which were found to exceed the action level.  Also second line, put a space between "micrograms" and "per"	A reference has been added.  This has been revised.
6-3	6.1.2	Third bullet, fourth line change "will" to "may"	This has been revised.
6-3	6.2	First line, change "An" to "A"	This has been revised.
6-4	6.2.2	Second line, delete ", as well as to limit off-site emissions". PPE does not minimize emissions.	This has been revised.
6-8	6.4.1	Personnel Sampling: Include calibration equipment information.	This has been revised.
6-8	6.4.3	Second paragraph.  a) Fifth line, after "visible dust levels to indicate when" insert "an upgrade to existing"  b) Fifth line, change "(wet spray)" to "(additional wet spray)"	This has been revised.  This has been revised.
6-8	6.4.3	After Table 6.1 indicate that the suspected cause of higher upwind dust readings was vehicular traffic adjacent to the site.	This has been revised.

## CORPS OF ENGINEERS ENGINEERING REVIEW COMMENTS

Reference	Item Number	Corps Comments	OHM's Response
8-101		Correct the spelling of "ROOSAVELT" Same comment also on page 8-102	This has been corrected.
Appendix B		██████████ first page third bullet, change "The alley was then capped..." to "The Driveway was then capped..."	This has been revised.
Appendix B		██████████ What about the fence work done on this site? No mention was made of the repairs to the fence.	No repairs were made to this fence per USEPA request.
Appendix B		Alley #6, First page, fifth bullet, the last sentence was not completed. Finish the sentence.	This has been revised.
Appendix B		Alley #7.5, First page, third bullet, change "sewer" to sewer"	This has been revised.
Appendix B		██████████ was not the cement (actually CMU) wall removed, with the owners permission?	OHM did not remove the cement wall.
Appendix B		██████████ first page, third bullet change "underdeveloped" to "undeveloped"	This has been revised.
Appendix B		██████████ first page, third bullet change "underdeveloped" to "undeveloped"	This has been revised.
Appendix B		██████████ first page, third bullet change "underdeveloped" to "undeveloped"	This has been revised.
Appendix B		██████████ did not this site have an existing foundation that was full of debris? No mention was made that we left the foundation and debris as we found it.	This has been revised.

**UNITED STATES ARMY CORPS OF ENGINEERS  
REVIEW COMMENTS**

Description	Comments	Action
Final Report	1. Page 2-5, Section 2.5.2, third bullet point - delete "grossly" from this sentence.	1. Deleted as requested.
	2. Page 5-3, Section 5.2.1 should be labeled as such.	2. Labeled appropriately.
	3. A discussion of the scope of work and technical approach for stack emissions residential work must be included in the report. This discussion can be brief, since site preparation was similar to that for residential battery chip cleanups and no confirmation sampling was necessary since all yards were excavated to a pre-determined depth based on previous sampling by Woodward-Clyde.	3. A discussion pertaining to the scope of work and technical approach for stack emissions has been inserted into Section 2.5 and Section 3.1.6.
	4. Section 9 - captions for the photographs should be corrected to match the actual photographs displayed in Section 9.	4. Photographs have been remounted and captions placed under each photo.
	5. Appendix A consists of only one sheet of paper. A summary of all air monitoring results should be included in Appendix A, or an explanation should be provided that the one sheet of paper is included only as an example of the format of air monitoring results.	5. The following note has been inserted to Appendix A, "All sites in all phases of the Granite City project had air monitoring done throughout the work process. The following table includes an example of air monitoring results that were typical of each site on the Granite City project. Every site is not presented in the final report to minimize the volume of paper."

## **TABLE OF CONTENTS**

---

<b>1.0</b>	<b>INTRODUCTION</b>	<b>1-1</b>
1.1	SITE HISTORY	1-1
1.2	PROJECT HISTORY	1-1
<b>2.0</b>	<b>SCOPE OF WORK PHASES 1 AND 2</b>	<b>2-1</b>
2.1	PREPARATION OF SITE-SPECIFIC PLANS	2-1
2.2	SITE ADMINISTRATIVE AND LOGISTICAL SUPPORT	2-2
2.3	MOBILIZATION AND DEMOBILIZATION	2-2
2.4	SITE PREPARATION AND TEARDOWN	2-2
2.5	OPERATIONAL SCOPE OF WORK PERFORMED	2-3
<b>3.0</b>	<b>TECHNICAL APPROACH PHASES 1 AND 2</b>	<b>3-1</b>
3.1	SAMPLING AND ANALYSIS TASKS	3-1
3.2	CSAP AMENDMENT/ADJUSTMENTS	3-4
3.3	TRANSPORTATION/DISPOSAL	3-7
<b>4.0</b>	<b>SCOPE OF WORK PHASE 3</b>	<b>4-1</b>
4.1	WORK PLAN DEVELOPMENT	4-1
4.2	SITE ADMINISTRATIVE AND LOGISTICAL SUPPORT	4-1
4.3	MOBILIZATION/DEMOBILIZATION	4-2
4.4	SITE PREPARATION AND TEARDOWN	4-2
4.5	OPERATIONAL SCOPE OF WORK PERFORMED	4-3
	FIGURE 4.1, SCOPE OF WORK PROVIDED TO OHM BY USACE	4-4
	FIGURE 4.2, STABILIZATION FLOW THROUGH	4-8
<b>5.0</b>	<b>TECHNICAL APPROACH PHASE 3</b>	<b>5-1</b>
5.1	SAMPLING AND ANALYSIS	5-1
5.2	CSAP AMENDMENTS/ADJUSTMENTS	5-3
5.3	TRANSPORTATION AND DISPOSAL	5-4
<b>6.0</b>	<b>HEALTH AND SAFETY SUMMARY</b>	
6.1	PROJECT SUMMARY AND CONCLUSIONS	6-1



## **TABLE OF CONTENTS (CONTINUED)**

---

6.2	SITE SAFETY AND HEALTH PLAN EVALUATION .....	6-3
6.3	SITE SAFETY .....	6-5
6.4	EXPOSURE MONITORING .....	6-6
	FIGURE 6.1, SSHP AMENDMENT .....	6-2
	FIGURE 6.2, SSHP AMENDMENT MINIRAM .....	6-7
	TABLE 6.1, MINIRAM READINGS ABOVE THE ACTION LEVEL (AL) ..	6-9
	TABLE 6.2, PERSONNEL LEAD MONITORING RESULTS .....	6-10
	TABLE 6.3. PERIMETER MONITORING RESULTS .....	6-11
7.0	QUANTITY SUMMARY TABLES .....	7-1
8.0	PRE-CHARACTERIZATION AND VERIFICATION ANALYTICAL SUMMARY TABLES .....	8-1
9.0	PHOTO REPRESENTATION .....	9-1
	9.1 TYPICAL ALLEY - ALLEY #53 .....	9-1
	9.2 TYPICAL HAZARDOUS RESIDENCE - 101 CARVER .....	9-2
	9.3 TYPICAL NONHAZARDOUS RESIDENCE - 1444 GRAND .....	9-2
	9.4 STABILIZATION .....	9-2

### **APPENDICES:**

**APPENDIX A - AIR MONITORING DATA**  
**APPENDIX B - WORK SUMMARIES**





## **1.0 INTRODUCTION**

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The United States Army Corps of Engineers tasked OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation, under the Rapid Response Contact No. DACW45-89-D-0516, Delivery Order No. 58, to perform removal of hard rubber battery case material at various locations associated with the NL Industries/Taracorp Superfund Site (NL Site) in Granite City, Madison and Venice, Illinois.

### **1.1 SITE HISTORY**

The NL Site includes the NL Industries/Taracorp Plant, a former lead smelting operation plant located at 16th Street and Cleveland Boulevard in Granite City, Illinois. Prior to 1903, the plant included various smelting related equipment and performed various processes. From 1903 to 1983, secondary lead smelting occurred on site. These activities were discontinued during 1983, and the equipment was dismantled.

In July 1981, St. Louis Lead Recyclers, Inc. (SLLR) began using equipment on adjacent property owned by Trust 454 to separate components of the Taracorp waste pile. The objective was to recycle lead bearing materials to the furnaces at Taracorp and send hard rubber off site for recycling. SLLR continued operations until March 1983 when it shut down its equipment. Residuals from the operation remain on Trust 454 property, with some equipment.

A State Implementation Plan for Granite City, Illinois was published in September 1983 by the Illinois Environmental Protection Agency (IEPA). The IEPA's report indicated that the lead nonattainment problem for air emissions in Granite City, Illinois, was in large part due to emissions associated with the operation of the secondary lead smelter operated by Taracorp and lead reclamation activities conducted by SLLR. The IEPA procured Administrative Orders by Consent with Taracorp, SLLR, Stackorp, Inc., Tri-City Truck Plaza, Inc., and Trust 454 during March 1984. The orders required the implementation of remedial activities relative to air quality.

NL Industries, as the former owner of the location, voluntarily entered into an Agreement and Administrative Order by Consent with the United States Environmental Agency (USEPA) and IEPA in May 1985 to implement a Remedial Investigation/Feasibility Study (RI/FS) for the location and other potentially affected areas; Taracorp was not party to the agreement due to the fact that it filed for bankruptcy. The USEPA determined that the location was a Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) facility, and it was placed on the National Priorities List (NPL) on June 10, 1986.

### **1.2 PROJECT HISTORY**

This final report is intended to provide a detailed description of the tasks involved in performing the cleanup activities as outlined in the original scope of services.



This final report summarizes activities and progress that eventually led to three phases of the project. Adjustments and amendments were made to the site specific plans based upon the new knowledge gained as the project progressed, which forced the project to be broken into three phases.

### 1.2.1 Phase 1

Phase 1 began with site mobilization in April 1993. The scope of work included excavation of hazardous soil (visible battery chips) and site restoration. A total of eleven sites were remediated in this phase. The eight residential properties included excavating of yard soil, verification sampling, placement of backfill and topsoil, and placement of sod for clean closure. The three Venice Alleys included the excavation of the alley slag/soil, placement of stone/backfill and concrete paving. Alleyways were not a clean closure at this time; they were capped by paving them. The alley properties had 1-foot of material removed based on previous analytical data. Due to lack of funds the site was demobilized in July 1993. Phase 1 expenditures totalled \$3,207,081 at completion.

### 1.2.2 Phase 2

Phase 2 was initiated with the site mobilization in September 1993. The scope of work initially included clean closure of four residential lots and 18 alleys. In general, the visible battery chips (hazardous) were to be excavated from each site, shipped to a hazardous landfill, and the property backfilled and restored. In actuality, only nine hazardous properties were completed.

At this point of Phase 2, a contract modification was approved to change the work to remediation of stack emissions lots (nonhazardous). The scope included removal of lead contaminated soils to a pre-determined depth (Woodward-Clyde data), and backfill and placement of sod.

OHM completed 14 stack emission lots before site demobilization in February 1994. This demobilization was conducted to save remaining funds for completion of known hazardous sites with on-site stabilization. The total expenditures for Phase 2 totalled \$2,856,945, with \$2,086,155 for the hazardous properties and \$770,790 for Stack Emissions lots.

### 1.2.3 Phase 3

At the request of USACE, OHM submitted a cost proposal for Modification Request No. P00006 in early January 1994. The proposal included the amended final work plans for the stabilization of hazardous waste in Granite City, Madison and Venice, Illinois. The intent of the stabilization process was to further reduce disposal costs by stabilizing the hazardous wastes from the sites at the Trust 454 location prior to actual disposal.

Preparations were made to construct the stabilization system at the 1459 State Street location and operate the system concurrently with ongoing remedial activities.



When Phase 3 began in April 1994, 21 previously pre-characterized sites were the primary sites targeted for remediation. The system was so successful that the scope of work was accomplished by mid-June of that year. At the time, the system was being disassembled and decontaminated, so the EPA instructed USACE to direct OHM to reassemble the system and process an additional 8 hazardous sites in Eagle Park Acres, Madison, Illinois. This work was also accomplished.

At the completion of these activities, in late July 1994, OHM was directed by USACE to perform a pilot study on the feasibility of stabilization of the huge slag pile on the Taracorp property. The stabilization system was utilized to perform this study, and a copy of the feasibility report was submitted to USACE in August 1994.

The total expenditures for Phase 3 totalled \$2,644,402.



## **2.0 SCOPE OF WORK PHASES 1 AND 2**

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This section of the final report describes the scope of work performed during the first two phases. The scope of work for this project was delineated by the document supplied to OHM by USACE entitled: Revised Final Scope of Work for Contract DACW45-89-D-0516; Delivery Order No. 58 Rapid Response, NL Industries/Taracorp Corporation, Granite City, Illinois.

The scope of work generally encompassed the following tasks:

- ▶ Preparation of site-specific plans
- ▶ Site administration and logistical support
- ▶ Mobilization and demobilization
- ▶ Site preparation and teardown
- ▶ Operational scope of work performed

### **2.1 PREPARATION OF SITE-SPECIFIC PLANS**

OHM prepared a site-specific project work plan which served as a guideline describing how the work was to be performed in order to meet the requirements specified by USACE. The work plan also included the CSAP and the HASP.

Variances to the work plan did occur during the performance of the project. These variances were performed only under authorization and direction of the USACE on-site representative(s) (OSR). The variances were implemented in order to more efficiently perform the project while still remaining within all regulatory requirements. The variances are referenced, described, and discussed in the relevant sections of this final report.

#### **2.1.1 CSAP**

The CSAP was prepared as a guideline describing how, where, and how many samples were to be collected, as well as how the samples were to be field screened whenever necessary. The CSAP delineated the laboratory analysis methods which were to be used in order to meet the requirements of USACE's revised scope of services. The CSAP was amended to add the Quality Assurance Project Plan(QAPP) during the actual performance of the work in response to actual field conditions. The amendments to the CSAP that are relevant to these phases are addressed in Section 3.2 of this final report.

#### **2.1.2 HASP**

The HASP was prepared as a guideline describing the health and safety procedures which were to be followed during the performance of the project. The HASP addressed physical, chemical, and environmental hazards specific to this project site. The HASP was amended during the project to



allow remedial work to be performed by personnel wearing modified USEPA Level D personal protective equipment (PPE). The results of the air monitoring indicated that personnel could perform work at the remedial locations wearing tyvek suits, booties, gloves, hard hats, and safety glasses without respirators. Details pertaining to health and safety issues are discussed in Section 6.0.

## 2.2 SITE ADMINISTRATIVE AND LOGISTICAL SUPPORT

Administrative and logistical support was provided by the OHM site supervisor, two OHM field accountants, and a support technician. A command post was established at a building located at 370 Old Rock Road, Granite City, Illinois. The team provided the field accounting services, subcontractor liaison, central communications, materials procurement, and logistical coordination.

Prior to excavation, OHM contacted the Julie Corporation to arrange for the identification of utilities at each remedial location. The Julie Corporation is a private not-for-profit organization which provides a liaison between contractors and the various utility companies. OHM contacted the Julie Corporation by telephone prior to initiation of work at each site. OHM was issued a "dig number" by the Julie Corporation as proof of notification to the utilities. The Julie Corporation notified the utility companies of the intended excavation at the respective sites. The utility companies were then responsible to identify any utilities in the area within 48 hours.

## 2.3 MOBILIZATION AND DEMOBILIZATION

Available OHM personnel and equipment were mobilized from OHM's facility in O'Fallon, Missouri. Key personnel such as administrative staff, team leaders, and equipment operators were mobilized from other available offices, as necessary. As manpower became available in the O'Fallon office the project, was staffed accordingly. OHM also made an extended effort to hire locally. OHM mobilized a large percentage of the heavy equipment utilized on this project from local vendors. OHM demobilized personnel and equipment as work was completed and as the resource demands of the project decreased.

## 2.4 SITE PREPARATION AND TEARDOWN

Site preparation and teardown involved two segments including:

- ▶ The command center at the former USACE maintenance building located near the Chain of Rocks Canal at 370 Old Rock Road in Granite City, Illinois
- ▶ Each remedial location

The command center served as the central location from which all personnel were dispatched to their respective work locations each day or as needed. The command center was located inside a concrete block building and was equipped with a computer, a copier, a facsimile machine, a telephone, and a base radio.



OHM also set up an XRF screening device and support equipment in a warehouse building located adjacent to the office building. The XRF screening device is described in Section 3.1.2 of this final report.

The warehouse building also served as a storage area for OHM's equipment, tools, and materials. During site teardown, OHM removed all of the equipment and tools from both the office building and the warehouse.

The site preparations performed at each of the remedial locations were similar. OHM set up decontamination points for personnel and equipment. Exclusion zones were established prior to the performance of excavation. The exclusion zones were identified with an orange snow fence. The exclusion zones remained in place until the laboratory analysis of confirmation samples were completed and/or until backfill had been completed to a sufficient depth.

## 2.5 OPERATIONAL SCOPE OF WORK PERFORMED

The excavation of contaminated soils involved the removal of contaminated soils and battery chips from the remedial sites. The restoration of the sites involved backfilling, seeding, sodding, and/or concrete paving of the sites after completing the remedial activities. Minor amounts of repairs and replacements of appurtenances at some of the locations were necessary. Items such as fences and drains were required to be moved during the performance of waste excavation and were replaced during the site restoration tasks. This section of the report summarizes the scope of work performed, rather than the planned scope of work. The methods utilized to complete the work are described in Section 2.5.2 and in the attached appendices.

The stated objective of this project was to excavate and dispose of fill material previously placed in alleys, parking lots, driveways, and yards at residential communities as per the Record of Decision (ROD) set forth between the USEPA, IEPA, and the PRP (potentially responsible party) group for this Superfund site.

The methods implemented to perform the work on this project fall into three categories:

- ▶ The alley locations
- ▶ The residential lots
- ▶ Stack emission lots

The methods implemented at the alley locations differed from the methods implemented at the residences because of the cleanup objectives. This section of the report describes the general approach implemented at both locations. The specific methods implemented and specific actions performed at each of the remedial locations are discussed in more detail for each location in the respective individual reports found in the attached appendices.



The methods implemented at the stack emission sites were the same as those implemented at the residential battery chip cleanups with the exception that no confirmation sampling was necessary. The reason behind this was that prior sampling was done by Woodward-Clyde and all yards were excavated down to a pre-determined depth per USEPA.

### **2.5.1 Pre-Construction Activities**

The pre-construction activities performed during this project were predominantly associated with obtaining disposal permits, transportation permits, preparing and delivering notifications of work to the public, attending public meetings, and identifying utilities at each remedial location. Many of these pre-construction activities were performed on an ongoing basis as the project progressed from one remedial location to the next.

#### **Permits**

The permits for the disposal of wastes for each of the sites requiring waste disposal were obtained prior to the shipment of wastes from the sites, as described in Section 3.6 and Section 3.7 of this final report.

#### **Utilities**

The transportation permits required for this project involved the acquisition of permits by OHM's subcontractors, who performed the transportation of wastes throughout the areas of Granite City, Madison, and Venice, Illinois.

The coordination of the identification of utilities was performed by the OHM project control technicians from the command center in advance of the work as it progressed from one remedial location to the next. This arrangement is described in Section 2.2 of this final report. No excavation activity was begun without a Julie Corporation "dig number."

#### **Meetings**

OHM worked closely with USACE and USEPA to formally notify the local governments and public of work at each community prior to performance of work. These notifications took primarily two forms:

- ▶ mailing written notifications
- ▶ public meetings arranged by the USEPA

On April 26, 1993, Jeff Habegger, OHM Project Manager, attended a public meeting at the Senior Citizens Meeting Hall in the city of Venice, Illinois. The meeting was arranged and chaired by Brad Bradley, Remedial Project Manager for the USEPA. The meeting was also attended by Greg Hoover, OSR for USACE. Brad Bradley described to the public and local officials in attendance the manner in which the work was to be performed, the air monitoring activities, and the



tentative schedule for performance of the work at the Venice alley locations. A second public meeting was held at the same location with the same attendees from OHM, USACE, and USEPA on April 27, 1993. The purpose of the meeting and the items discussed were the same as the first meeting.

On May 6, 1993, Jeff Habegger and Chuck Malin, OSR for USACE, attended a meeting with Venice Mayor Tyrone Echols and John Ervin, Alderman of Streets and Alleys for the city of Venice. The purpose of the meeting was to emphasize to the mayor the need to communicate the project work plans for the Venice alleys to all of the related city departments and to gain information related to the identification of the right-of-way for the alleys so that the remediation and paving at the alleys could be coordinated with the city.

### **2.5.2 Construction Activities-Lots and Alleys**

The remediation at the ally locations and the restoration of the alleys, primarily the paving work, was driven by the requirements of the ROD which required removal of the battery chips and pavement of the alleys. At this time, the alleys were not excavated to the 500 milligrams per kilogram (mg/kg) cleanup criteria because the alleys were paved. At this time, no confirmation sampling was performed at the alleys.

#### **Alley Activities**

The following activities were performed at the alleys:

- ▶ The exclusion zone was delineated by encircling the alleys with orange snow fence.
- ▶ Decontamination points were established for personnel and equipment.
- ▶ Battery chips and soils contaminated with visible battery chips were excavated.
- ▶ The subbase was compacted with a smooth drum vibratory compactor prior to placement of the aggregate backfill material.
- ▶ Compaction of the subbase was spot-checked with a penetrometer prior to placement of the aggregate backfill material.
- ▶ Alleys were compacted with a smooth drum vibratory compactor while backfilled.
- ▶ Compaction of the aggregate was checked every five feet with a penetrometer to ensure 95% compaction.
- ▶ The final top grade was established and adjusted as needed, manually or with equipment, prior to concrete work.





- ▶ Concrete was poured to a 15 foot width the entire length.

### **Residential Lot Activities**

At the residential lots, the work progressed in a slightly different manner than the alley work because of the difference in operational objectives. The contaminated soil was removed to lead concentrations below 500 mg/kg. OHM's basic remedial approach centered around the XRF screening efforts as described in Section 3.1.2.

Operational activities progressed at the residential lots as follows:

- ▶ Delineated an exclusion zone by encircling the entire residential lot with orange snow fence.
- ▶ Established decontamination points for personnel/equipment.
- ▶ ~~Excavated and removed battery chips and soil grossly contaminated with visible~~ battery chips within the confines of the property lines, and readied the site for a visual inspection by the OHM site supervisor as well as the USACE and USEPA representatives.
- ▶ Performed the collection of soil samples based upon the triangular grid centers of 20 feet for Spectrace 9000 X-ray fluorescent screening instrument (XRF) screening of the samples at the command post.
- ▶ Based upon the results of the XRF screening efforts, continued the excavation and sample/screening efforts or submitted the samples for laboratory analysis to confirm the cleanup criteria of 500 mg/kg. As the project progressed, utilized the grid sampling pattern to identify specific grids within the site ready for backfill.
- ▶ Backfilled the sites as the areas were confirmed to be clean.
- ▶ Backfilled, compacted, and supervised the pavement of driveways/parking lots as necessary prior to sodding or seeding of the yards.
- ▶ Supervised seeding and/or sodding of the site, as required.



### **3.0 TECHNICAL APPROACH PHASE 1 AND 2**

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This section of the final report describes the technical approach implemented to complete the work. The operational effort extended was supported by the technical information that was gained through implementation of the following:

- ▶ Sampling and analysis
- ▶ CSAP amendment/adjustment
- ▶ Transportation and disposal

#### **3.1 SAMPLING AND ANALYSIS TASKS**

The sampling and analysis tasks for this phase involved these items:

- ▶ Waste disposal sampling and analysis
- ▶ Field screening of soil samples to confirm removal of contaminated soils
- ▶ Laboratory confirmation sampling and analysis
- ▶ Pre-characterization sampling and analysis of additional sites under modification to the delivery order

##### **3.1.1 Waste Disposal and Analysis**

OHM collected samples from each site for the purposes of waste characterization analysis. The samples collected from the remedial locations that were anticipated to require the removal of hazardous wastes were combined to form one composite sample and analyzed for landfill disposal analysis.

The samples collected from the remedial locations that were anticipated to require removal of nonhazardous waste were combined to form one composite sample and analyzed for landfill disposal analysis.

The verification of waste characterization was performed at each site by the pre-characterization efforts. The characterization of the nonhazardous wastes were confirmed at each site with the performance of TCLP lead analysis of composite samples collected from each site during the pre-characterization efforts.



### **3.1.2 Field Screening of Soil Samples**

An XRF was used to assist in defining the concentrations of lead present at each remedial location as the excavation proceeded. A criteria of 370 mg/kg was determined by comparing the XRF results and the actual laboratory analytical as a calibration check. The analytical differences were then put through a statistical calculation to determine the margin of error. The XRF was used to screen soil samples to remove all material with lead concentrations above 500 mg/kg.

As per the scope of services issued to OHM by USACE, material at the residential sites which exhibited concentrations of total lead greater than 500 mg/kg were removed and disposed. Samples were collected from each remedial site based upon a triangular grid pattern of 20 feet. In order to incorporate a margin of error into the screening process, samples which exhibited concentrations of total lead greater than 370 mg/kg were considered contaminated. If a sample exhibited a concentration of 370 mg/kg or greater when screened with the XRF, OHM was directed to consider the sample a representative of a contaminated area requiring further excavation. The screening criteria of 370 mg/kg of lead for the XRF was determined by USACE.

### **3.1.3 Laboratory Confirmation and Analysis**

At the residential sites, OHM first excavated visually contaminated material, then collected and screened samples with the XRF. Areas which were represented by samples exhibiting concentrations of lead greater than 370 mg/kg were further excavated. Samples which represented areas exhibiting concentrations of lead less than 370 mg/kg were sent to ECC Laboratories for confirmation laboratory analysis. ECC analyzed the confirmation samples according to USEPA's "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", SW-846, 2nd Edition, September 1986. The samples were prepared by SW-846, Method 3050, Acid Digestion of Sediments, Sludges and Soils, and analyzed according to SW-846, Method 7420 for total lead within 24 hours from the time the samples were received by the laboratory. The verbal/preliminary analysis results were provided by the laboratory to the project command post.

### **3.1.4 Site Pre-characterization Sampling and Analysis**

As the project progressed, the need to establish the level of effort anticipated for each upcoming site became much more apparent. The need to pre-characterize each of the remedial locations to establish reasonable estimates of hazardous waste and nonhazardous waste requiring removal was prepared as an amendment to the CSAP. The site pre-characterization sampling and analysis efforts were first applied to the Venice Alleys, then to several residential sites, and ultimately the effort was applied to all additional sites, including residential lots and alleys. The primary purpose of the pre-characterization sampling of the sites was to confirm or refute the potential presence of hazardous waste at each remedial location and to obtain an indication of the extent of potential contamination present at the sites with lead concentrations greater than 500 mg/kg. The most efficient and productive approaches to the pre-characterization sampling and analysis were ultimately developed for the alleys and the residential lots which included the steps included in the following paragraphs.



### **Sample Points**

The pre-characterization sampling at the alleys involved the establishment of no less than five sample points at the center line of each alley located at equal distance from one another along the entire linear length of each alley. For example, an alley 100 feet long would have 5 sample points, 20 feet from one another located at the centerline of the alley. At each of the sample points, the visually contaminated battery chips were removed. The battery chips were considered hazardous waste and were removed and disposed regardless of the results of the pre-characterization sampling and analysis. The depth/thickness of the battery chip layer was noted in the sampler's log book for reference. Three samples were then collected with an auger bucket at 6-inch intervals to a total depth of 18 inches below the bottom of the battery chip layer.

The first 6-inch interval collected from each of the sample points was sent to ECC Laboratories and analyzed for Total Lead using SW-846 Method 7420 as described in Section 2.6.1. The first 6-inch interval sample collected from each sample point was also analyzed for lead by SW-846 Method 7420 after first preparing the samples with the Toxicity Characteristics Leachate Procedure (TCLP). The second 6-inch interval (soil located at 6 inches to 12 inches below the bottom of the battery chip layer) was analyzed for total lead only. The third 6-inch interval (representing soils at 12 inches to 18 inches below the bottom of the battery chips) was put on hold for potential analysis pending the results of the analysis performed on the first two 6-inch intervals.

### **Sample Locations**

Pre-characterization sampling and analysis at the residential lots involved the establishment of 12 sample locations at each site. The 12 sample points were placed onto a grid allowing each sample to be equal distance from one another, covering the entire lot and allowing for buildings and other appurtenances. Prior to collecting samples at each location, the gross layer of battery chips (if present) was removed. Three samples were then collected from each sample location. The samples were collected from each location at 6-inch intervals to a depth of no greater than 18 inches below the bottom of the battery chip layer. If a gross layer of battery chips was not found at the sample location, the samples were collected to a total depth of 18 inches from the existing surface grade of the sample point.

### **Composites**

The samples were then composited in a manner which would generate results representative of each 6-inch interval, but in a manner not requiring the discrete laboratory analysis of each sample. The samples were composited horizontally into five composites per depth interval. For example, a typical residential site had 12 sample locations with 3 samples collected at each sample location. Sample locations 1, 2, and 3 were collected in proximity to one another and representing a specific portion of the residential lot. The same process was repeated throughout the entire residential lot until five composite samples were generated for each depth interval and 15 total composites were generated.



Sample locations 1, 2, and 3 were collected in proximity to one another and representing a specific portion of the residential lot. The same process was repeated throughout the entire residential lot until five composite samples were generated for each depth interval and 15 total composites were generated.

### **Analysis**

The laboratory analysis of the composites followed the same logic as was applied at the alley locations. The five composites representing the top 6-inch layer of each of the locations were analyzed for total lead and TCLP lead. The second set of five composites representing the 6-inch to 12-inch interval of the locations were analyzed for total lead only. The third set of composites representing the 12-inch to 18-inch depth interval were put on hold pending the results of the laboratory analysis of the first two sets of composites.

### **3.1.5 Pre-characterization of Additional Sites**

Under authorization of Delivery Order No. 58 Modification PQQQQ1, OHM performed the pre-characterization sampling of 21 additional sites, beyond the original scope of services. The objective of the pre-characterization of the additional sites was to determine the potential presence of lead contamination and to anticipate the planning of remediation at these same sites. The technical approach for this task involved the same approaches as described in Section 3.1.4. These additional sites were eventually remediated during the Phase 3.

### **3.1.6 Technical Approach to Stack Emission Lots**

The technical approach to the stack emission lots differed from the residential battery chip cleanups in the respect that no confirmation sampling was necessary. The reason for this was that prior sampling that was done by Woodward-Clyde and all yards were excavated to a pre-determined depth per USEPA. In addition to this, all waste went out as special-direct to a landfill.

## **3.2 CSAP AMENDMENT/ADJUSTMENTS**

There were several amendments and adjustments to the CSAP as the project progressed. The amendments and adjustments did not change the objective of the sampling and analysis efforts, but the amendments and adjustments were implemented to more efficiently reach the objectives of the CSAP. The formal amendments to the CSAP included the following items:

- ▶ A project specific Quality Assurance Project Plan (QAPP) was prepared in response to a request from USACE.
- ▶ An amendment was prepared to establish pre-characterization sampling and analysis of remedial sites for performance prior to initiation of remediation.



Less formal adjustments to the implementation of the CSAP included the following items:

- ▶ A project-specific sample numbering system was designed and implemented.
- ▶ The portion of the CSAP which addressed the sampling of the 1-cubic-yard tote bags was not implemented because the 1-yard tote bags were not utilized on the project as planned.
- ▶ The CSAP originally established two grid sampling patterns for the site/excavation screen sampling and the site/excavation confirmation sampling. Ultimately, OHM dropped the sampling grid pattern for the site/excavation screen sampling and applied the grid pattern designed for the confirmation sampling to both.

Each of the items listed is discussed in this section.

### **3.2.1 Project-Specific Quality Assurance Project Plan**

OHM prepared the project specific QAPP in response to a request from USACE. The plan is entitled *The Quality Assurance Project Plan for Remediation of Locations in Granite City, Madison, and Venice, Illinois, Associated With NL Industries/Taracorp Superfund Site*. The plan was issued as a formal amendment to the CSAP. The plan was prepared in draft form and submitted to USACE for review and approval. The plan was approved by USACE and formally recognized as a CSAP amendment on May 5, 1993. The objective of the plan was to provide assurance of quality laboratory analysis measurements during the execution of the plan.

### **3.2.2 Development of the Pre-Characterization Sampling and Analysis**

The objective of pre-characterization of a given remedial site is to acquire an indication of the extent of contamination at each site. Section 3.1.4 describes the methods which were finally developed and applied as a results of the lessons learned in the field. This section describes the development of the pre-characterization sampling and analysis.

The need for developing a pre-characterization procedure came as a result of the extensive remediation necessary to complete the Missouri Avenue site, the need to confirm the extent of hazardous waste present at the alleys, and the need to obtain waste characterization of the suspected nonhazardous waste sites. The USEPA, USACE, and OHM joined in a concerted effort to develop a plan for pre-characterizing remedial sites prior to initiation of remediation. USACE requested that OHM develop an amendment to the CSAP to establish the vertical extent of hazardous waste present at the Weber Avenue alley and the Abbott Avenue alley on, or about, May 6, 1993. OHM responded with a draft amendment to the CSAP on May 13, 1993. The review of the draft amendment by USACE resulted in a request to OHM for more specific details as to the compositing scheme at the alleys.



A meeting was held on May 19, 1993, at the project command post in Granite City, Illinois, to discuss the pre-characterization sampling and analysis. The meeting attendees included Chuck Malin, USACE OSR; Mary Wichman, USACE Project Chemist; and Hearn Tidwell, OHM Project Chemist. During this meeting, the objectives of the amendment for the pre-characterization of the sites were established. The items discussed included: sampling and analysis of the nonhazardous waste stockpile at 203/205 Terry, sampling and analysis of the Venice alleys, and sampling and analysis of the suspected nonhazardous waste remedial locations.

The objective for the sampling of the stockpile at 203/205 Terry was to characterize the waste stockpiled there as nonhazardous waste and to establish the stockpile as representative of the typical nonhazardous waste that would be removed from the remaining remedial locations.

The objective of the pre-characterization sampling and analysis at the alleys was to characterize the wastes at the alleys as either hazardous or nonhazardous waste. This objective served two purposes:

- ▶ To characterize the waste for waste disposal profiling purposes. Only the soil samples which failed the TCLP analysis test were required to be removed at the alleys.
- ▶ To define the extent of excavation.

The objectives for the pre-characterization sampling and analysis at the residential lots were to establish hazardous versus nonhazardous waste characterization at each of the sites and to obtain indications of the potential extent of lead contamination (present at the sites) above 500 mg/kg.

OHM designed the site pre-characterization sampling and analysis procedures described in Section 3.1.4 to reach these objectives.

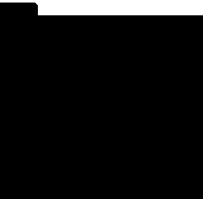
### **3.2.3 Project Specific Sample Numbering System**

A site-specific sample numbering system was devised to assist in the identification of samples in relationship to their remedial site location and the sequence in which the sample was sent to the laboratory. The sample numbering system was implemented as described below:

S MO XXX YY  
1 2 3 4

1. Matrix: a) S: Solid  
b) L: Liquid

2. Remedial Location: a) HA  
b) TO:  
c) CO:  
d) CA:  
e) HO:



- f) 2T: [REDACTED]
- g) MO: Missouri Avenue
- h) DR: [REDACTED]
- i) CL: [REDACTED] and

- 3. Sample number for particular site
- 4. Sequential number to define the number of samples collected and shipped to ECC (This number was eventually dropped because it caused confusion in the sample point identification.)

### **3.2.4 Deletion of the Tote Container Sampling**

USACE decided not to utilize the tote bags for containerization of the nonhazardous wastes as originally planned. USACE determined that the direct loadout of nonhazardous wastes into the dumptrucks was more efficient. Because tote bags were not utilized, OHM did not perform this type of sampling.

### **3.2.5 Deletion of Screen Sampling Grid Pattern**

The CSAP originally established two grid sampling patterns for the site/excavation screen sampling and the site/excavation confirmation sampling. Ultimately, OHM dropped the sampling grid pattern for the site/excavation screen sampling and applied the grid pattern designed for the confirmation sampling to both. This reduced a duplication of efforts, but it in no way compromised the integrity of the sampling and analysis.

## **3.3 TRANSPORTATION AND DISPOSAL**

The wastestreams for Phase 1 and 2 included hazardous and nonhazardous soil. Phase 1 hazardous shipments were sent Peoria Disposal Company in Peoria, Illinois. The nonhazardous soils were shipped to Laidlaw in Bridgeton, Missouri. The hazardous waste was shipped by Beelman Trucking with additional trucks provided by Jack Gray Transport. The nonhazardous shipments were hauled by Cunningham Hauling.

The disposal facilities changed in Phase 2. Due to capacity problems and density issues, Peoria Disposal Company shared the hazardous wastes with Heritage Disposal in Indianapolis, Indiana until Heritage also had problems with daily capacity. The hazardous soil eventually was disposed at Envirite in Harvey, Illinois. The nonhazardous disposal was also changed to Laidlaw in Edwardsville, Illinois, for cost and time savings.





### **3.3.1 Transportation of Waste**

Each site was identified by a unique 2-digit number. The site was then utilized as the first 2 digits of the 5-digit manifest document numbers assigned when shipment occurred. This system ensured that the truck's origin was documented.

The same system was utilized for shipment of nonhazardous waste. The state of Illinois requires each special waste shipment be on an Illinois State manifest. This allowed each shipment of hazardous and nonhazardous wastes to be cross-referenced with the pre-printed Illinois manifest document numbers.

### **3.3.2 Disposal of Wastes**

#### **Hazardous**

The project involved the removal and disposal of wastes deemed to be RCRA hazardous wastes because the materials exhibited concentrations of lead greater than 5 milligrams per liter (mg/l), when the leachate was analyzed after preparation according to TCLP. The hazardous wastes were sent to Peoria Disposal Company (PDC). PDC stabilized the wastes and placed them into a Subtitle C RCRA-hazardous waste landfill.

The waste disposal characterization was determined by analyzing composite samples as described in Section 3.1.1 of this final report. Materials which contained gross amounts of battery chips were assumed to be hazardous wastes and were shipped and disposed accordingly. Verification of waste characterization was performed at each site by the pre-characterization efforts.

#### **Nonhazardous**

This project also involved the removal and disposal of special nonhazardous industrial waste (nonhazardous waste) which was primarily removed from residential locations. The nonhazardous waste was removed from the areas where the hazardous wastes had already been removed or where no hazardous wastes were present. The objective of the nonhazardous waste excavation efforts was to remove all material exhibiting concentrations of total lead above 500 mg/kg, but less than 5 mg/l when analyzed by TCLP.

The nonhazardous waste characterization were confirmed at each site with the performance of TCLP lead analysis of composite samples collected from each site.

The Health Department for the County of St. Louis required an approved-waste profile for each remedial location from which nonhazardous wastes were removed. The disposal facility subcontracted to provide the disposal of nonhazardous wastes for this project was Laidlaw Waste Systems in Bridgeton, St. Louis, Missouri. OHM obtained the approved waste profile by providing composite samples collected from stockpiles or by analyzing pre-characterization samples by TCLP.



The permits and analytical profiles for nonhazardous wastes were prepared and approved by the Health Department of the County of St. Louis for each remedial location prior to shipment and disposal. The special waste was eventually accepted and sent to Laidlaw Waste Systems in Edwardsville, Illinois.



## **4.0 SCOPE OF WORK PHASE 3**

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The scope of work remained the same as described in Section 2.0 of this final report with the exceptions of CSAP amendments/adjustments as described in Section 5.2. Operational techniques during Phase 3 remained the same as during Phases 1 and 2. The only other addition to the ongoing operation was the side stream operation of the stabilization process. This portion of this final report will address the following tasks:

- ▶ Work Plan Development
- ▶ Site Administrative and Logistical Support
- ▶ Mobilization and Demobilization
- ▶ Site Preparation and Teardown
- ▶ Operational Scope of Work Performed

### **4.1 WORK PLAN DEVELOPMENT**

The revised work plan submitted to USACE encompassed the stabilization operation and support units. Field activities that involved site remediation followed the work plans already in place. These plans were submitted to USACE prior to site activities and were the guide by which all site activities were conducted

### **4.2 SITE ADMINISTRATIVE AND LOGISTICAL SUPPORT**

The project site administration was centrally established at the former USACE maintenance facility. Site administrative activities performed from this location included:

- ▶ Site Supervision
- ▶ Cost tracking/reporting
- ▶ Health and safety administration
- ▶ Waste tracking/documentation
- ▶ Field sampling/analytical support
- ▶ Field purchasing/subcontract management
- ▶ Logistical support

Prior to full scale mobilization, logistical preparation activities were performed. These activities included:

- ▶ Conducting a pre-construction meeting
- ▶ Arranging for waste hauling licenses
- ▶ Meeting with property owners
- ▶ Locating utilities at each site



- ▶ Establishing transportation routes
- ▶ Coordinating with local agencies and hospital

### 4.3 MOBILIZATION/DEMOBILIZATION

This task involved the transportation of personnel, equipment, and other resources to and from the project site. A majority of the personnel and equipment were mobilized at the beginning of the project and demobilized at the end of the project. This was especially true for the supervisory/administrative personnel and the support equipment such as vehicles and decontamination/office trailers. Available personnel and equipment were mobilized from OHM's St. Louis and O'Fallon, Missouri, offices. As more local personnel became available, OHM staffed the project accordingly. OHM also made an extended effort to hire locally. OHM mobilized three excavation crews for removal and stockpiling hazardous materials. A fourth crew was for setting up and operating the stabilization process.

#### 4.3.1 Subcontractors

Subcontractor mobilization and demobilization were managed by the OHM project manager in conjunction with the site supervisor, and USACE when site-specific needs were identified. Subcontractors worked on electrical power for the stabilization plant, placement of stabilization pad, paving alleys, and placing sod.

#### 4.3.2 Permits and Licenses

All necessary permits and licenses were secured before site mobilization. The most crucial approval was issued by IEPA for the stabilization process. OHM was required to submit responses to the applicable ARARs for the stabilization plant. The IEPA was not required to provide a permit but did have to approve that OHM met the intent of the ARAR. The transporter companies and disposal facilities were USEPA-licensed operation. Prior to mobilization, all on-site employees had completed Occupational Safety and Health Administration (OSHA) 40-hour hazardous materials training.

### 4.4 SITE PREPARATION AND TEARDOWN

The site preparation and teardown task involved three segments. Sites were set up and torn down at the following locations:

- ▶ The command center at a former USACE maintenance building located near the Chain of Rocks Canal at 370 Old Rock Road in Granite City, Illinois
- ▶ The stabilization pad at the Trust 454 site located on State Street in Granite City
- ▶ Each given remedial location site



#### **4.4.1 Command Center**

The command center served as the central location from which all personnel were dispatched to their respective work locations each day or as needed. The command center was located inside a concrete block building and was equipped with a computer, copier, facsimile machine, telephone, and base radio. OHM also set up an XRF screening device and support equipment in a warehouse building located adjacent to the office building. The warehouse building also served as a storage area for OHM's equipment, tools, and materials. During site teardown, OHM removed all of the equipment and tools from the office building and the warehouse.

#### **4.4.2 Stabilization Pad**

The site preparations performed at the Trust 454 stabilization site included the set-up of an asphalt pad with a full perimeter berm. This pad was used to store hazardous and treated soil, and it served as the foundation for the stabilization equipment and rain water run-on or run-off control. The pad served as the exclusion zone and was identified with orange snow fencing. The exclusion zone stayed in place until all of the hazardous soil from the remote locations were treated, and the pad and stabilization equipment was decontaminated. A decontamination area and a small office trailer were set up outside the exclusion zone.

#### **4.4.3 Remedial Locations**

The site preparations performed at each of the remedial locations were similar. OHM set up decontamination points for personnel and equipment. Exclusion zones were established prior to the performance of excavation. The exclusion zones were identified with orange snow fencing. The exclusion zones remained in place until the laboratory analysis of confirmation samples were completed and/or until backfill had been completed to a sufficient depth.

Excavation equipment used on the site was decontaminated before demobilization. Gross contamination was scraped from the machines prior to being washed. The decontamination rinse water was collected and applied to the last loads of contaminated soil as a dust control measure.

### **4.5 OPERATIONAL SCOPE OF WORK PERFORMED**

The excavation of contaminated soil involved the removal of contaminated soils and battery chips from the remedial sites. The restoration of the sites involved the actual backfilling, seeding, and sodding of the sites after completing the remedial activities. The scope of work for this portion of the project is illustrated in Figure 4.1.

OHM's schedule for excavation was developed to facilitate logistic management and limit the time required to transport equipment and crews from location to location. During excavation activities, engineering controls and security measures such as surrounding the exclusion zones with fluorescent orange PVC barrier fencing was employed to prevent cross contamination and unauthorized entry to exclusion zones.



**FIGURE 4.1**

**SCOPE OF WORK  
PROVIDED TO OHM BY USACE**

The contractor shall be required to provide all plant, labor and material, and perform all work necessary to treat and stabilize lead (RCRA) contaminated soil and battery chips and other debris. It is estimated that the amount of contaminated soil is between 3,000 to 5,000 tons.

The site for processing shall be furnished to the contractor rent free, water and electricity are accessible at site. Hook up, metering and payment for utilities shall be the responsibility of successful subcontractor. The contractor shall obtain all necessary permit for his operations and material shall be processed within the time frame required by Haz waste regulation.

Samples shall be provided for bench test, which will be performed on the soil to determine what process will be necessary to stabilize the lead to meet RCRA Disposal Requirements for Special Waste.

The soil shall be delivered to the staging area and stockpiled by others. The successful contractor will perform tests, treat and stabilize the soil from the stockpile, and document tests necessary to certify shipment according to DOT and OSHA regulations. Perimeter air monitoring will be performed by the prime contractor for dust control efforts.

The subcontractor will have to cooperate with the prime contractor on off-loading and loading of stockpiles in the immediate area.

The analytical report of the soils will be furnished to the subcontractor before receipt of material.

22, October 93  
Rev. 5

Each of the sites had unique characteristics which mandated particular methodologies of remediation. In general, the locations were separated into two categories:

- ▶ Residential yards
- ▶ Alleys/driveways

#### **4.5.1 Pre-construction Activities**

Pre-construction activities for this portion of the project included the following items:

- ▶ Conducting a pre-construction meeting with USACE
- ▶ Issuing subcontracts
- ▶ Communicating with Julie to locate potential underground utilities at the sites
- ▶ Obtaining permits
- ▶ Obtaining soil samples for waste characterization
- ▶ Videotaping residential properties for restoration purposes

Many of these activities were performed on an ongoing basis as the project proceeded from one remedial location to the next

Many areas, mainly in Eagle Park, had to be grubbed prior to excavation. An advance crew with appropriate equipment cleaned and prepared these locations.

#### **4.5.2 Construction Activities-Lots and Alleys**

The primary construction activities for this phase of the project included the following:

- ▶ Mobilization of personnel and equipment
- ▶ Site preparation including clearing and grubbing of support areas and the setup of support zones, decontamination stations, and exclusion zones
- ▶ Site preparation and fencing of the stabilization area at the Taracorp/Trust 454 property
- ▶ Stabilization of lead contaminated hazardous waste
- ▶ Excavation of contaminated soils
- ▶ Visual and/or analytical determinations of removal criteria fulfillment
- ▶ Backfill and compaction activities
- ▶ Paving and/or landscaping activities



The excavation techniques employed at each location varied according to location accessibility, depth, and the extent of material. Minimization of disturbances to adjoining properties/areas was also a key consideration in performing each excavation. OHM used tracked excavators, backhoes, Bobcats, and manual removal methods.

Dust control was a major consideration. A hydro meter and hose were available at all times to prevent fugitive emissions. A water truck was also utilized to provide additional dust control and to transport water to sites for decontamination.

Most of the residential yards needed to have sod removed at varying depths of soil. These wastes were excavated using a tracked excavator, backhoe, and/or a bobcat. At some locations, hand digging was necessary. Hazardous soil was loaded into licensed waste hauler trucks for transportation to the Trust 454 property.

Most of the alleys and driveways contained aggregate soil mixtures. Most locations were accessible to the tracked excavator, but some required smaller equipment and hand digging. The wastes removed from parking lots and alleys were segregated as hazardous or nonhazardous waste. Hazardous waste was classified by visible battery chips. Nonhazardous (special waste) was classified analytically. The hazardous waste was directly loaded into licensed haul trucks and sent to the stabilization operation site. Alleys were backfilled and chip sealed; some required minor landscaping at the edges of the pavement (i.e., top soil, raking, and seeding).

#### **4.5.3 Stabilization Activities**

Stabilization is a chemical/physical process which immobilizes hazardous constituents, enabling the treated waste to meet or exceed federal and state standards prior to landfill disposal. The stabilized material met the applicable "treatment standards" specified in 40 CFR 268.41 which is 5 mg/l for D008

#### **Stabilization Area**

A small pre-manufactured structure was erected on the hazardous side of the storage pad for containment of hazardous soil prior to the stabilization process. The temporary storage structure was structurally sound during inclement weather. Due to the productivity of the pugmill, some hazardous soil had to be stored outside the building and was protected from the wind and rain by inert foam material.

The stabilization area was also protected by an HDPE liner/stone/asphalt cover to prevent further soil contamination. A berm was built around the perimeter of the stabilization area to prevent run-off and run-on. The area was sloped to sumps to collect run-off. Any water build-up in the stabilization area was pumped into the holding tank for reagent mixing. The nonhazardous storage area was constructed with the same materials and slope.





### **Stabilization System**

OHM's stabilization system consisted of a variety of feeders, conveyors, silos, and a pugmill mixer integrated into a complete system for the continuous mixing of wastes and reagents. The contaminated soil was fed to a live bottom feeder and then led by conveyor into the pugmill for blending with the stabilization additive. As the untreated material entered the pugmill, it passed over a weigh belt unit to record the tonnage of the material to be treated. The weigh belt provided a continuous record of the performance of the stabilization system. The stabilization additive material was introduced from the silo feeder which attached to the pugmill. The silo feed rate was correlated with the weigh belt to ensure the appropriate ratio of stabilization additive was delivered to the pugmill in a consistent manner. The treated material was then conveyed to a storage area for verification testing. A flow-through of the process is illustrated in Figure 4.2. Each pile consisted of 100 tons, and each pile was labeled for identification.

Processed waste piles remained in the stabilization area until acceptable analytical results permitted shipping. At the end of each day's activities, the waste piles were covered with a foam mixture to secure the stabilized material from the weather and to minimize dust emissions from the stabilized storage area. All piles were covered and maintained with a weather-resistant foam mixture until loadout was completed.

The treated material was stockpiled in 100 ton lots for post treatment confirmation. Samples were taken as representative grab samples from each stockpile, as outlined in the CSAP that was provided with the approved work plans. Following confirmation, treated material was then loaded out for disposal off site.

Decontamination water was used for dust control during the loadout of processed materials. There was no disposal of any decontamination liquids due to the usage of this water for dust control measures and reagent mixing in the pugmill. Quantity summaries from the stabilization operation can be found in Section 7 of this final report.

#### **4.5.4 Restoration**

After receiving analytical result(s) confirming the cleanup criteria of 500 parts per million (ppm) had been achieved, OHM restored the locations to pre-remedial conditions. Excavation areas were backfilled with clean soils and restoration completed as required by the Scope of Work. Fencing and other structures removed during remediation were replaced and sodding, seeding, and revegetation were performed where necessary.



## Stabilization Preparation

## Stabilized Waste Placement

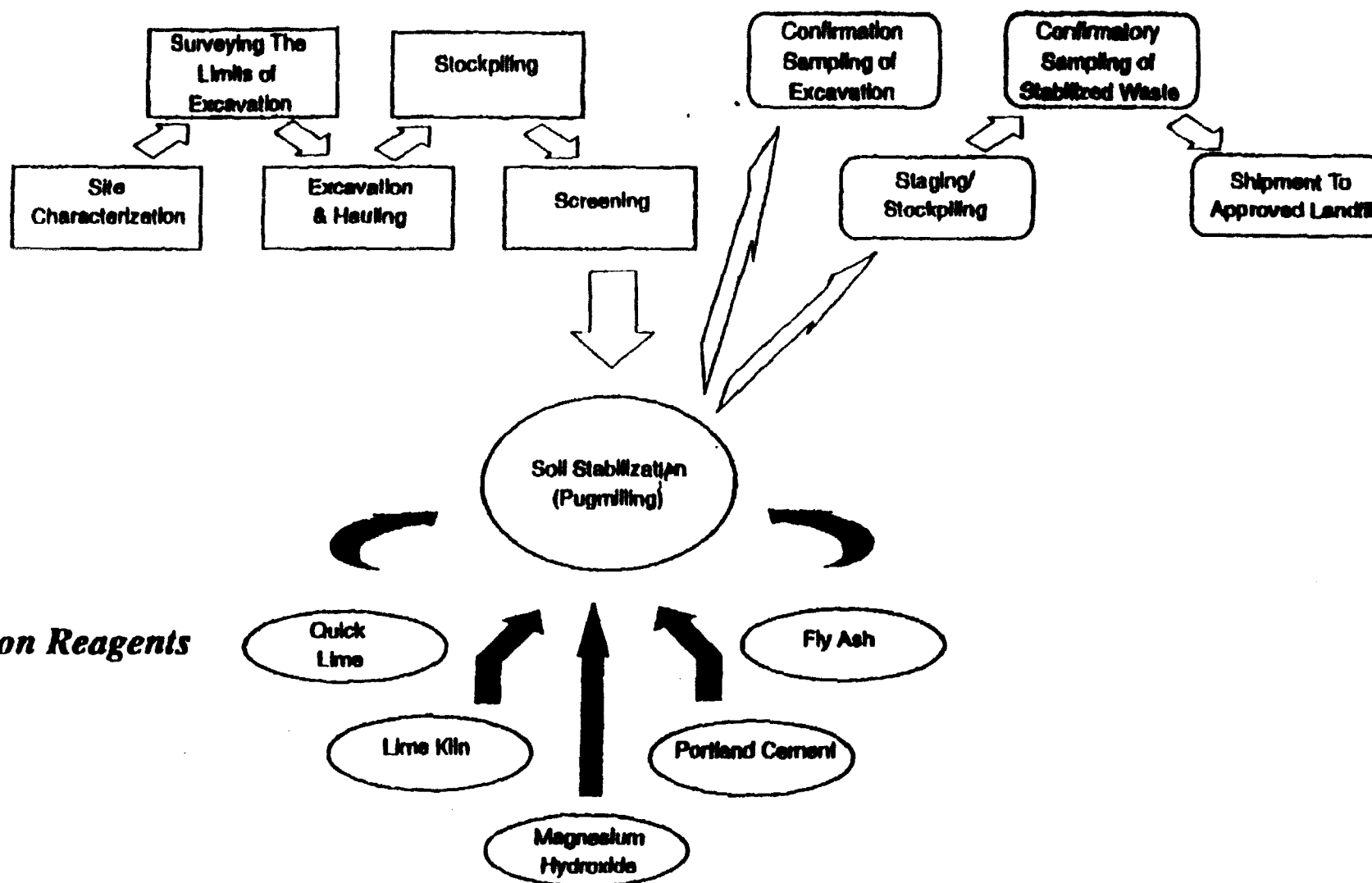


FIGURE 4.2

STABILIZATION METHODOLOGY

#### 4.5.5 Waste Removal

Wastes removed from the sites were transported to one of two locations. Hazardous wastes were transported to the Trust 454 property for stabilization. This transportation was documented using manifests approved by the IEPA. Stabilized hazardous waste which was re-characterized as nonhazardous waste was transported to a nonhazardous RCRA Subtitle D landfill. Nonhazardous wastes that were removed from the sites were transported directly to the nonhazardous waste Subtitle D landfill. OHM utilized licensed haulers and disposal firms for all wastestream shipments.



## 5.0 TECHNICAL APPROACH PHASE 3

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The stated objectives of this phase were to continue to excavate and dispose of fill material placed in alleys, lots, driveways, and yards at residential communities, and to perform a stabilization process of the hazardous soils, as per the ROD among the USEPA, IEPA, and the PRPs for the Superfund site.

This section describes the general technical approach implemented to complete this work. The methods employed to perform the work on this project fall into three categories:

- ▶ alley locations
- ▶ residential lots
- ▶ Trust 454 stabilization process site

The methods implemented at the alley locations were the same as the residential locations during this phase. The alleys were no longer being capped with concrete, but with tar and chip sealant. Excavation was restricted to 3 to 4 feet in depth. If special waste was still encountered (Location #65.5) at that depth, the excavation was stopped, and a polyethylene barrier was installed prior to total backfill activities.

The operational techniques utilized were guided by the following information:

- ▶ Sampling and Analysis
- ▶ CSAP Amendments/Adjustments
- ▶ Transportation and Disposal

### 5.1 SAMPLING AND ANALYSIS

The sampling and analysis tasks for this phase involved the following items:

- ▶ Field screening of soil samples to confirm removal of contaminated soils
- ▶ Laboratory confirmation sampling and analysis
- ▶ Stabilized soil sampling analysis verification
- ▶ Pre-characterization sampling and analysis
- ▶ Field screening of soil samples to confirm removal of contaminated soils

An XRF was used to assist in defining the concentrations of lead present at each remedial location. The XRF was used to screen soil samples for assistance in the removal of all material with lead concentrations above 500 mg/kg.

As per the direction of USACE, material at the residential sites and alleys which exhibited concentrations of total lead greater than 500 mg/kg were removed and disposed. Samples were



collected from each remedial site based upon a square grid pattern of 25 feet. In order to incorporate a margin of error into the screening process, samples which exhibited concentrations of total lead of greater than 370 mg/kg were considered contaminated at a sufficient concentration to potentially generate total lead results of greater than 500 mg/kg when analyzed at the laboratory. If a sample exhibited a concentration of 370 mg/kg or greater when screened with the XRF, OHM was directed to consider the sample a representative of a contaminated area requiring further excavation. The screening criteria of 370 mg/kg of lead for the XRF was determined by USACE.

### **5.1.2 Laboratory Confirmation Sampling and Analysis**

At the residential sites and alleys, OHM excavated contaminated material with visible battery chips first. The screening samples exhibiting concentrations of lead greater than 370 mg/kg were sent to ECC Laboratories for confirmation laboratory analysis. ECC analyzed the confirmation samples according to USEPA's Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846, 2nd Edition, September 1986. The samples were prepared by SW-846, Method 3050, Acid Digestion of Sediments, Sludges and Soils, and analyzed according SW-846, Method 7420 for total lead within 24 hours from the time the samples were received by the laboratory. The verbal/preliminary analysis results were provided by the laboratory to the project command post.

### **5.1.3 Stabilized Soil Verification**

As hazardous soil from each remote location was treated and stockpiled on the stabilization pad, it was necessary to verify that the lead in the soil was stabilized to meet RCRA Disposal Requirements for Special Waste.

To accomplish this, a one quart grab sample was taken from each 100 cubic yards of soil that was processed. The samples from each pile were documented and logged, and the location of each pile on the pad was mapped so that each sample could be tracked back to the pile that it came from.

OHM utilized an MRD-approved lab, Environmental Chemical Corporation (ECC) to perform the TCLP analysis. A 2-day turnaround time was required for all samples. The test methods used on the treated soil were USEPA TCLP Method 1311, sample preparation Method 3010, and analytical Method 7420 (AA lead). No soil was loaded out from the disposal process until analytical results, from the OHM QC officer, verified stabilization.

### **5.1.4 Pre-Characterization Sampling and Analysis of Additional Sites**

In June 1994, OHM was directed by USACE to pre-characterize additional sites in Eagle Park Acres, Madison, Illinois for remediation. The pre-characterization of these sites was implemented as described in Section 3.1.4 of this final report.



## 5.2 CSAP AMENDMENTS/ADJUSTMENTS

There were several amendments and adjustments to the CSAP as Phase 3 progressed. The amendments and adjustments did not change the objective of the sampling and analysis efforts, but instead, the amendments and adjustments to the sampling plan were implemented as knowledge was gained as the project progressed. The formal amendments to the CSAP included the following items:

- ▶ An amendment was prepared to establish a new method of post excavation confirmation/verification sampling.
- ▶ A plan was written for pre-characterization sampling of additional sites in Eagle Park Acres.
- ▶ An amendment was written to cover the disposal sampling and analysis at the stabilization pad.
- ▶ An Amendment was Prepared to Establish a New Method of Post Excavation Verification Sampling.

The verification sampling plan was designed to establish that the lead contamination at a particular remote location had been successfully removed. Prior to Phase 3 of this project, the sampling had been done by utilizing a 20 foot grid system. This led to an exorbitant amount of samples to be screened through the XRF (Spectrace 9000 Xray Fluorescent Screening instrument), delaying progress.

Before Excavation began on Phase 3, at the request of USACE, an amendment to the CSAP was written to reduce the number of samples but in no way compromise the integrity of the sampling and analysis. The amendment was accepted in April 1994.

### 5.2.1 A Plan was Written for Pre-Characterization of Additional Sites in Eagle Park Acres

An additional plan was designed describing similar activity in Eagle Park Acres to be held on file for Phase 3. The methods described were used during the pre-characterization activities as instructed by USACE during June 1994.

### 5.2.2 Amendment for Disposal Sampling and Analysis of Stabilized Soils

Before the stabilization operation was constructed and implemented, an approved and final amended work plan for stabilization of hazardous waste in Granite City, Madison and Venice, Illinois that was associated with NL Industries/Taracorp under contract NO. DACW-45-89-0-0516 Delivery Order Number 58 was submitted to USACE.



### 5.3 TRANSPORTATION AND DISPOSAL

The T&D of waste removed from the sites included the removal of hazardous and nonhazardous wastes. The hazardous wastes were transported to the waste stabilization pad at the Trust 454 site by Atlantic Waste Services, Inc. The treated special waste was transported to Laidlaw Waste Systems in Edwardsville, Illinois by Cunningham Trucking Company and Beelman Trucking Company. The non-treated special waste was hauled directly from the remote remedial sites to Laidlaw Waste Systems in Edwardsville, Illinois by Cunningham Trucking Company. The transportation of all wastes was performed by licensed haulers with tractor trailer and tandem dump trucks.

#### 5.3.1 Transportation of Waste

All shipments of hazardous waste were initially weighed before being taken to the stabilization pad. After several weeks of operation, it was decided by the USACE OSR that weighing each truck was unnecessary, so this process was eliminated. The weight of all trucks was estimated as 12 tons per truck.

To ensure that each shipment of waste was properly documented and that the origin of each load could be tracked, a unique manifest numbering system was used. Each site was identified by unique 2-digit number. The site number was then utilized as the first 2 digits of the 5-digit manifest document number assigned when shipment occurred. This system ensured that the origin of the trucks was documented.

The same system was utilized for all shipments of special waste shipped directly to the landfill site. The state of Illinois required each special waste shipment be on an Illinois State manifest. This allowed each shipment of hazardous and nonhazardous waste to also be cross referenced with the preprinted Illinois manifest document number.

The shipments of treated special waste from the stabilization pad at the Trust 454 site started at #00001 and were consecutive. This eliminated any confusion as to where any special waste came from. Any manifest document number starting with "00", represented a treated special waste.

#### 5.3.2 Disposal of Wastes

The project involved the removal and disposal of wastes deemed to be RCRA hazardous wastes because the materials exhibited concentrations of lead greater than 5 mg/l, when the leachate was analyzed after preparation according to TCLP. The hazardous wastes were sent to the on site stabilization pad to be stabilized. Once stabilized, the waste was sent via Cunningham Trucking Company and Beelman Trucking Company to Laidlaw Waste Systems, in Edwardsville, Illinois.

This project also involved the removal and disposal of special nonhazardous wastes which were primarily removed from residential and alley locations. The nonhazardous waste was removed



from those areas where the hazardous wastes had already been removed or there were nonhazardous wastes were present. The objective of the nonhazardous waste excavation efforts was to remove all material exhibiting concentrations of total lead above 500 mg/kg, but no less than 5 mg/l when analyzed by TCLP.

The waste disposal characterization was determined by analyzing composite samples as described in Section 3.1.1 of this final project report. Materials which contained gross amounts of battery chips were assumed to be hazardous wastes and were shipped, stabilized, and disposed of accordingly.

Verification of waste characterization was performed at each site by the pre-characterization efforts. The nonhazardous wastes characterization of the nonhazardous waste were confirmed at each site with the performance of total lead analysis of composite samples collected from each site.





## **6.0 HEALTH AND SAFETY SUMMARY**

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### **6.1 PROJECT SUMMARY AND CONCLUSIONS**

#### **6.1.1 Summary**

The following summarizes the health and safety aspects of this project:

- ▶ One amendment was made to the SSHP to address changes made to the level of personal protection required (refer to Figure 6.1 of this report for a copy of the amendment).
- ▶ One OSHA recordable accident took place on site. The accident did not result in any lost work time and appropriate provisions were made to prevent future incidents.
- ▶ Task specific hazard evaluations were performed each day at each work site prior to the start of work.
- ▶ Air monitoring data was used during this project to ensure that appropriate personal protection was being used for site conditions. Personnel medical monitoring was performed prior to and at the end of the project to determine lead levels in the blood.
- ▶ MINIRAM data was used to determine when dust control measures should be upgraded to prevent/control exposure as well as perimeter emissions. Data collected indicated 26 instances where the action level was exceeded; visual criteria was used to determine when to implement dust control.
- ▶ Perimeter sampling data for total lead indicated 10 samples with concentrations above the detection limit. Visible dust emanating from the site perimeter was used as criteria for implementing dust control.
- ▶ Personnel air sampling data indicated 13 detectable readings for total lead. Only four of those exceeded the action level of 15.0 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), set by the USACE; all were recorded prior to June 2, 1993 (refer to Table 6.2). Personnel were outfitted in Level C PPE and were therefore adequately protected. There were no recorded cases of personnel overexposure to ambient lead levels.



FIGURE 6.1

To: Chuck Malin  
From: Mark Proctor  
Date: May 20, 1993  
Subject: Amendment to Safety and Health Plan  
Rapid Response Lead Contamination Remediation

As we discussed today with Jim Woolcott, we propose to amend the Safety and Health Plan to downgrade the level of protection specified in section 6.3, Task Specific Protection Level. Specifically, it is proposed to eliminate the requirement for respiratory protection and use Modified Level D during excavation and load out activities involving contaminated soil.

Air sampling has been performed at each project site to monitor both personnel exposures and concentrations of airborne lead at the perimeter of the exclusion area. No airborne lead has been detected in any of the samples collected to date; all samples have been less than 2 micrograms of lead per cubic meter of air.

The OSHA standard for occupational exposures to airborne lead requires that personnel exposures be maintained below 50 micrograms/cubic meter based on an eight hour, time weighted average. The Corps of Engineers has established an action level of 15 micrograms of lead per cubic meter. It is proposed to don air purifying respirators in the event that any breathing zone sample exceeds 15 micrograms of lead /cubic meter. Air samples will be collected to document the actual conditions at the job sites.

This change will be implemented effective May 21, 1993. The work at the Missouri Avenue site will not be changed. Level C will be used during the remainder of the excavation and load out at the Missouri Avenue site.

pc: Jeff Habegger  
Bill Thomas

### 6.1.2 Conclusions

Following completion of the project, the OHM Health and Safety Department made the following conclusions:

- ▶ The SSHP was effectively implemented to address the health and safety hazards associated with each phase of site operations and to meet the requirements set forth in 29 CFR 1910.120.
- ▶ The existing SSHP is appropriate for future phases of work at this site involving the same work activities.
- ▶ Future work should be performed in Level D PPE with appropriate air monitoring to verify the selection of PPE. An action level of 30 ug/m<sup>3</sup> should be used to warrant controls. Once monitoring shows consistent readings below the action level, the amount and frequency of air monitoring may be appropriately limited/reduced.
- ▶ Special attention should be paid to prevent any recordable accidents and near misses during the course of future work. Routine tasks should be reviewed and evaluated for potential hazards. Daily safety meetings should be implemented to prevent injuries on site

## 6.2 SITE SAFETY AND HEALTH PLAN EVALUATION

A SSHP was issued before the start of this project to address the health and safety hazards associated with each phase of site operations. The plan met the requirements of 29 CFR 1910.120. The phases of work addressed in the SSHP include the following:

- ▶ Mobilization
- ▶ Installation of perimeter fence
- ▶ Bagging and stockpiling nonhazardous material
- ▶ Soil sampling
- ▶ Excavation of contaminated soil
- ▶ Load-out of contaminated soil
- ▶ Backfill of excavation
- ▶ Restoration of disturbed areas
- ▶ Decontamination and demobilization

### 6.2.1 Provisions

Once on site, waste materials were designated to be directly loaded into dump trucks instead of being bagged.



Provisions were made to address heavy equipment, excavation, and other physical hazards. Hazards associated with vehicle and pedestrian traffic in the work areas near roadways were controlled by the use of warning signs, men at work signs, and road guards to direct traffic.

#### 6.2.2 PPE

PPE provisions were made to minimize exposure to lead contamination for personnel on site. The minimum of Level C PPE was required at the start of work on this project, to include the following:

- ▶ Full-face air purifying respirator with GMC-H cartridges
- ▶ Hard hat
- ▶ Polycoated Tyvek coveralls
- ▶ Steel toed boots
- ▶ Nylon booties (inner)
- ▶ Robar/Tingley boots (outer)
- ▶ Vinyl sample gloves (inner)
- ▶ Cloth, leather, or PVC gloves (outer)

An amendment was made to the SSHP for downgrading the level of PPE from Level C to Level D for personnel working in the exclusion zone. This amendment was issued based on air monitoring data analysis showing non-detectable levels or levels of ambient lead contamination consistently below the action level for samples taken in the excavation areas. The amendment was issued by the site-safety officer, under the direction of the Regional Health and Safety Manager, who is certified by the American Board of Industrial Hygiene. The amendment was approved June 2, 1993 by USACE Representative Chuck Malin (refer to Figure 6.1 for a copy of the amendment).

The downgrade of PPE made provisions for personnel to wear Level D PPE during site activities to include the following protective equipment:

- ▶ Hard hat
- ▶ Safety glasses
- ▶ Steel toed leather safety shoes/boots
- ▶ Polycoated Tyvek coveralls
- ▶ Nylon booties (under) and Robar/Tingley boots (outer)
- ▶ Inner sample gloves - outer cloth or leather gloves

An action level of  $15.0 \mu\text{g}/\text{m}^3$  of airborne lead, as determined by integrated sampling, was set by USACE to upgrade the level of PPE to Level C, including use of an air purifying respirator. Air monitoring was performed for the duration of remedial activities to ensure proper PPE use.



## 6.3 SITE SAFETY

### 6.3.1 Accidents

Employee safety was OHM's first priority. During the course of this project, one OSHA recordable accident occurred. An employee cut his knuckle and finger while he was working on a metal fence post. The employee received stitches and was able to return to work without recording any lost work time. The accident was investigated and the potential hazard was brought to the attention of site personnel during a morning safety meeting the following day.

The employees were instructed to use protective leather/cut resistant work gloves during activities involving sharp surfaces and tools and to protect sharp or dangerous work surfaces.

### 6.3.2 Preventive Measures

A number of measures were taken on site to prevent accidents and injuries. Daily safety meetings were held to discuss hazards associated with upcoming work tasks, the use of specific tools and equipment, and other chemical, physical and environmental hazards associated with site work. Task specific hazard evaluations were performed each day at each work site prior to the start of work.

Controls were used to eliminate the hazards associated with vehicle and pedestrian traffic near the work locations. Warning signs were posted and guards were used to direct traffic.

A heat stress prevention program was also instituted on site. Personnel heat stress monitoring was performed to prevent heat related illnesses during work in high ambient temperatures. Employees' body weights were recorded at the start of the work shift and were rechecked at the end of the shift to determine any change in body weight potentially due to fluid loss. Site workers' pulses, body temperatures, and blood pressures were taken before and after each break. Work-rest schedules were determined by the results of this monitoring in accordance with the SSHP heat stress monitoring criteria.

Specific work-rest regimens were established at the start of every work day, based on the specific work conditions for that day (temperature, time of day, amount of sun or shade, etc.) Breaks were taken as designated throughout the work shift in shady areas, with PPE removed and cool liquids (juice, water) provided. Visual observation by a designated safety official was used to identify individuals exhibiting symptoms of heat-related illness and to take the necessary action.

## 6.4 EXPOSURE MONITORING

Because the on-site activities for this project involved excavation of lead contaminated soil and battery casings, the potential for exposure to these contaminants existed through dust migration in the air and personnel and equipment tracking.



#### **6.4.1 Methodology**

Air monitoring was performed to determine the ambient levels of total suspended particulates generated during excavation and to determine total ambient lead exposure for site personnel and perimeter emissions. Wind direction at the start of each work day was used to determine the placement of sampling instruments on site. Refer to Appendix A, Air Monitoring Data, for the air monitoring protocol used during site operations.

##### **Direct Reading**

Direct reading aerosol monitors (MINIRAM Aerosol Monitor, Model PDM-3 or equivalent) were used to determine levels of total suspended particulates (dust) at each excavation site. The MINIRAM is based on the detection of scattered electromagnetic radiation (light.) The MINIRAM requires no pump for its operation and is designed to respond to particle sizes in the range of 0.1 to 10 micrometers ( $\mu\text{m}$ ). It displays its results as  $\text{mg}/\text{m}^3$ , and the measurement ranges are 0.01 to 10  $\text{mg}/\text{m}^3$  and 0.1 to 100  $\text{mg}/\text{m}^3$ ,  $\pm 0.02 \text{ mg}/\text{m}^3$  (1 minute averaging). MINIRAMS were zeroed daily before each reading (approximately every 30 minutes) to ensure effective measurements.

MINIRAMS were used on site to supplement visual observation in providing effective dust control. Three samples were taken approximately every 30 minutes during site operation; one sample was taken upwind of excavation operations and two were taken downwind. Results were recorded in a logbook kept on site.

The MINIRAM air monitoring was discontinued based on the recorded results. It was determined that visual monitoring by personnel was as effective as the use of the MINIRAM (see Figure 6.2).

##### **Integrated Sampling**

Personnel and perimeter samples were taken to determine the levels of total lead in the air in the personal breathing zone and at the site perimeter. Lead samples were collected and analyzed using NIOSH Method 7082, using battery operated air sampling pumps (Gillian or equivalent) fitted with 37-mm mixed cellulose ester (MCE) filters, 0.8-micron pore diameter.

##### **Perimeter Sampling**

Three perimeter samples were taken daily over the course of the work shift. One sample was taken upwind of site operations, and two were taken downwind. Perimeter samples were taken above ground level (approximately 4 to 5 feet in height) to characterize the breathing zone and to prevent contamination due to foot traffic. The pump flowrate was calibrated and set at about 10 liters per minute for the duration of the task (approximately 8 hours).



FIGURE 6.2

TO: Chuck Malin  
Dave Strickland  
Bill Thomas  
Jim Wysock

FROM: Mark Sackman

DATE: Wednesday, October 20, 1993

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On October 20, 1993 at 10:15a.m., Brad Bradley approved the discontinuation of perimeter Mini-Ram Air Monitoring. This decision was based on the previous air monitoring results taken.

It was felt that visual monitoring by site personnel for dust is just as effective as the use of the Mini-Rams. Another factor in the decision was the proven effectiveness of the wetting techniques practiced by OHM personnel and the resulting favorable analytical information as received by client for lead in air.

Sincerely,

A handwritten signature in black ink, appearing to read 'MSL', written over a horizontal line.

Mark Sackman  
OHM Health & Safety Officer

Pumps were calibrated using a secondary standard, a rotameter, to determine the sample flowrate. Calibration readings and sample results were documented in project logbooks that were kept on site. Analytical and calibration data are available from OHM.

### **Personnel Sampling**

Personnel air samples for lead were taken for a representative number of employees performing intrusive activities within the exclusion zone (one employee from each job category-- at least two employees per day). The samples were taken in the person's breathing zone for the duration of the shift worked that day. Samples were collected at the end of the work day and sent to the analytical laboratory for analysis for total lead. A blank sample was included in the shipment.

Samples were assigned identification numbers based on an established code. The analytical laboratory used was Chemtex, 3082 25th Street, Port Arthur, Texas. Standard turnaround time for sample results was 24 hours by facsimile; original data was then returned by mail.

Direct reading (MINIRAM) and integrated (perimeter) samples were taken in approximately the same locations (within 3 feet) at the work sites. Equipment calibration information is outlined in the project SSHP, Section 9.0 (Environmental Monitoring).

### **Medical Monitoring**

Personnel blood lead levels were determined prior to and after the completion of work for this project. Monitoring was performed in accordance with the requirements of 29 CFR 1910.1025 for personnel working in contaminated areas.

#### **6.4.2 Action Levels**

Action levels were determined for use with the MINIRAM by taking a predetermined average, provided by USACE, and adding it to the background reading taken at the start of the work shift.

The action level was used to determine when dust control measures were implemented. If the action level was exceeded during the course of work and was believed to be caused by site activities (i.e. downwind of excavation), operations were stopped and wet spray control measures were implemented to reduce/eliminate dust emissions. Work in the work zone resumed once visible emissions were controlled and readings dropped to below the action level.

During lead excavation operations for this project, the specified action levels for the MINIRAM and personnel monitoring were exceeded 26 and 4 times respectively, primarily at the Missouri Avenue site. The majority of these readings were the result of upwind samples, attributed to area vehicle traffic rather than site operations.





**6.4.3 Sample Results****MINIRAM Monitoring**

Readings were taken daily on site, approximately every 30 minutes, using the MINIRAM; one upwind and two downwind of excavation/intrusive activities.

The total dust levels detected by the MINIRAM over the course of this project ranged from non-detectable ( $ND < 0.01 \text{ mg/m}^3$ ) which reads 0.00 on the monitor, to approximately  $4.0 \text{ mg/m}^3$  of total dust. The majority of these readings did not exceed their location specific action levels and did not exceed the ACGIH TLV of  $10 \text{ mg/m}^3$ . The readings were used in conjunction with visible dust levels to indicate when an upgrade to existing dust control measures were needed (additional wet spray).

The following table includes a listing of some of the instances in which the action levels for total dust were exceeded and the surrounding circumstances.

<b>TABLE 6.1</b>				
<b>MINIRAM READINGS ABOVE THE ACTION LEVEL (AL)</b>				
<b>Number &gt;AL (<math>\text{mg/m}^3</math>)</b>	<b>AL (<math>\text{mg/m}^3</math>)</b>	<b>Location</b>	<b>Date</b>	<b>Operations Performed</b>
1 @ .23 1 @ .21	0.17	Missouri Avenue (downwind)	4/15/93	Loading truck, excavating
1 @ .18 1 @ .23 1 @ .15	0.14	Missouri Avenue (upwind)	4/16/93	Excavating, loading, clearing fence line
3 @ 1.46 8 @ 2.09 3 @ 2.10	0.25	Missouri Avenue (upwind)	4/21/93	Excavating, loading trucks
1 @ 2.5	2.49	Missouri Avenue (upwind)	4/28/93	Soil loadout
1 @ 2.54	2.53	Missouri Avenue (upwind)	4/29/93	Excavating
2 @ 2.53 2 @ 2.63 1 @ 2.83	2.51	Missouri Avenue (upwind)	5/6/93	Excavating



The upwind total dust levels detected by the MINIRAM were consistently higher than the downwind levels over the course of work on this project. The suspected cause of higher upwind dust readings was due to vehicular traffic adjacent to the site.

### **Personnel Monitoring**

Personnel performing intrusive activities such as operating or spotting an excavator, stockpiling operations, hand excavating, loading soils, etc. were sampled for total airborne lead exposure. Samples were taken in the individual's breathing zone, using Gillian sampling pumps equipped with 37-mm cassettes. NIOSH Method 7082 was used for sampling and analysis.

The majority of samples analyzed showed non-detectable levels of lead. Detectable lead levels were found under the circumstances as listed in the following table. Non-detectable levels ranged from less than 0.0002 to less than 0.0025 mg/m<sup>3</sup>.

TABLE 6.2			
PERSONNEL LEAD MONITORING RESULTS			
Date	Level (mg/m <sup>3</sup> )	Location	Activity
4/23/93	0.00021	[REDACTED]	Guiding/lining trucks
4/27/93	0.4120	[REDACTED]	Guiding/lining trucks; hand excavating
5/13/93	0.0510	[REDACTED]	Hand excavating
5/17/93	0.1320	[REDACTED]	Spotting, placing bows on trucks
5/18/93	0.009	[REDACTED]	Hand excavating
	0.0610	[REDACTED]	Hand excavating
5/18/93	0.0020	[REDACTED]	Spotter
5/19/93	0.0100	[REDACTED]	Spotter, erecting bows
6/7/93	0.0021	[REDACTED]	Hand excavating
6/18/93	0.0056	[REDACTED]	Hand excavating; spotter
6/25/93	0.0021	[REDACTED]	Truck loading
6/29/93	0.0015	[REDACTED]	Excavator Operator
6/30/93	0.0014	[REDACTED]	Operator



Until the addendum to the HASP was made on June 2, 1993, site personnel working in the exclusion zone wore at all times MSA full-face air purifying respirators with GMC-H cartridges.

As is evident in the personnel monitoring data, the highest detectable level of lead was 0.4120 mg/m<sup>3</sup> 8-hour TWA. This individual as well as the majority of personnel with detectable exposure levels of lead over the AL were performing very close, intrusive operations such as hand excavating lead contaminated soils. Other personnel were spotting excavator operations, which put them in close proximity to the dusts generated during excavation. As all of these readings (>AL) were logged before June 2, 1993, personnel were outfitted in Level C PPE including an air purifying respirator at all times during the course of work. There were no readings over the action level after June 2, 1993, and therefore, the level of protection (Level D) was appropriate for work being performed.

### **Perimeter Monitoring**

Perimeter sampling for lead levels emanating from the site was conducted using the same sampling and analytical method as the personnel sampling; however, the pumps were mounted and positioned around the perimeter of the site (one upwind and two downwind), in approximately the same locations as the MINIRAMS.

Perimeter sample results indicated predominantly non-detectable lead levels. Table 6.3 presents detectable lead levels and the surrounding circumstances. Non-detectable levels ranged from less than 0.00025 to less than 0.002 mg/m<sup>3</sup>.

TABLE 6.3 PERIMETER MONITORING RESULTS			
Date	Location	Reading (mg/m <sup>3</sup> )	Activity
5/17/93	[REDACTED]	0.0005 (upwind)	Stocking and loading trucks
		0.0017 (downwind)	Stocking and loading trucks
6/4/93	[REDACTED]	0.00095 (upwind)	Loading trucks
6/7/93	[REDACTED]	0.00195 (upwind)	Excavating
6/9/93	[REDACTED]	0.0038 (upwind)	Loading trucks
6/15/93	[REDACTED]	0.0006 (upwind)	Excavating
6/16/93	[REDACTED]	0.0022 (upwind)	Excavating



OHM CORPORATION  
PROJECT 13407  
FINAL REPORT  
QUANTITY SUMMARY  
12/05/94

SITE NAME	HAZARDOUS TONS	SPECIAL TONS	STABILIZED TONS	CONCRETE SQ YD	SOD SQ YD	SEED SQ YD	CA-6 TON	CA-7 TON	SAND CUBIC YD	TOP SOIL CUBIC YD	BACKFILL TON	3" STONE TON	ROCK TON
ALLEY 53	550.4-PM	308		0	0	0	0	0	0	0	0	0	592.45
ALLEY49	554.5-PM	90		0	0	0	0	0	0	0	0	0	602.05
ALLEY 62	259.16-PM	54		0	0	0	0	0	0	0	0	0	340.75
ALLEY 6	312-PM	234		0	0	0	289.25	250.64	163.8	0	0	0	0
ALLEY 7.5	240-PM	162		0	0	0	100.17	259.1	0	0	0	0	0
ALLEY 65	168-PM	0		0	0	0	57.31	16.21	0	0	0	0	227.95
ALLEY 65.5	144-PM	0		0	0	0	0	0	0	0	0	0	153.65
ALLEY 62.5	175.9-PM	72		0	0	0	0	0	0	0	0	0	268.72
ALLEY 13	288-PM	108		0	0	0	337.74	283.59	0	0	0	0	0
	228-PM	144		0	250	0	0	0	0	0	8 LOADS	0	0
	336-PM	36		0	0	YES	0	0	0	0	45 LOADS	0	3 LOADS
	36-PM	144		0	0	YES	0	0	0	0	16 LOADS	0	2 LOADS
	180-PM	54		0	0	YES	0	0	0	0	16 LOADS	0	3 LOADS
ALLEY 19	264-PM	54		0	0	0	210.56	242.58	0	0	0	0	0
	96-PM	0		0	0	YES	0	0	0	0	12 LOADS	0	1 LOAD
SITE 36.5(MCKINLEY)	24-PM	0		0	0	0	0	14.57	0	0	0	0	0
SITE 54.5(WEBER)	48-PM	36		0	0	0	0	14.59	0	0	0	0	0
	336-PM	198		0	0	YES	0	0	0	0	55 LOADS	0	3 LOADS
	84-PM	18		0	0	YES	0	0	0	0	6 LOADS	0	1 LOAD
	48-PM	18		0	0	YES	0	0	0	0	7 LOADS	0	0
	108-PM	18		0	0	YES	0	0	0	0	31 LOADS	0	6 LOADS
	747-PM	0		0	0	YES	0	62.1	0	0	03 LOADS	0	4 LOADS
	80-PM	36		0	0	YES	43.37	0	0	0	10 LOADS	0	0
	172-PM	36		0	0	YES	0	32.9	0	0	10 LOADS	0	1 LOAD
	402-PM	0		0	0	YES	0	28.85	0	0	41 LOADS	0	0
	690-PM	306		0	0	YES	0	28.85	0	0	69 LOADS	0	0
	287-PM	90		0	0	YES	0	0	0	0	8 LOADS	0	0
	253-PM	90		0	0	YES	215.03	20.2	0	0	3 LOADS	0	1 LOAD
	57-PM	90		0	0	YES	92.16	8.65	0	0	1 LOAD	0	0
PUGMILL	*7167.96-PM		*8259.61				491.12						

TOTALS:

29 SITES	7167.96-PM	2394	8259.61	0	250	16 SITES	1836.53	262.83	163.8	0	439	0	1422.45
													25 LOAD

PM=PUGMILL\*

\*ALL PUGMILL WASTE WAS STABILIZED  
WASTE THAT WAS SHIPPED TO LAIDLAW  
AFTER PROCESSING  
PROCESSING PERCENT OF REAGENT AND WATER=13.5%

## **8.0 PRECHARACTERIZATION AND VERIFICATION SUMMARY TABLES**

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This section lists the results of the sampling and analytical performed at each hazardous location. Refer to Appendix B for Work Summaries for individual locations.

Results for pre-characterization for lots and alleys are total lead measured in mg/kg and TCLP lead measured in mg/l.

Verification results for lots and alleys are total lead measured in mg/kg.

The special waste lots were excavated to a pre-determined depth, and no post excavation sampling was required.

The pug mill stabilized soils were sampled and analyzed for TCLP lead and measured in mg/l.



**OHM CORPORATION**  
**PROJECT 13407**

## -CHARACTERIZATION SAMPLING RESULTS

**SITE NAME: MISSOURI AVENUE**

[illegible]

**ECC RESULTS  
MISSOURI AVENUE**

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
SMO33428	176	SMO38898	208
SMO33529	23.9	SMO39067	133
SMO33630	435	SMO39269	131
SMO33731	338	SMO393100	236
SMO33832	16.2	SMO394101	133
SMO33933	188	SMO39570	77
SMO34034	120	SMO39671	63
SMO34135	362	SMO39772	142
SMO34236	26.1	SMO39873	69.6
SMO34337	11	SMO39974	131
SMO34438	263	SMO40075	93.9
SMO34539	78.2	SMO401102	71.2
SMO34640	55.7	SMO403103	211
SMO34741	75.9	SMO404104	70
SMO34842	158	SMO405105	108
SMO34943	273	SMO406106	191
SMO35044	415	SMO40719	33.9
SMO35145	458	SMO408B76	26.4
SMO35347	246	SMO40977	10.3
SMO35448	214	SMO41078	64.8
SMO35549	118	SMO41179	146
SMO35650	131	SMO41280	236
SMO35751	164	SMO43017	262
SMO35852	195	SMO43118	22.2
SMO35953	264	SMO432124	*2730
SMO36054	147	SMO433107	24.4
SMO36155	80.8	SMO434108	17
SMO362116	9.4	SMO435109	22.2
SMO36389	297	SMO442119	67.8
SMO36490	49.7	SMO443120	13.7
SMO36591	29.3	SMO444121	127
SMO36692	23.8	SMO445122	115
SMO36793	30.3	SMO439110	48.4
SMO36894	332	SMO440111	300
SMO36957	167	SMO441112	22.3
SMO37058	207	SMO30617	93
SMO38159	146	SMO30718	246
SMO37396	47.5	SMO30819	158
SMO37495	106	SMO30920	171
SMO37599	18.9	SMO31021	110
SMO37797	31.5	SMO31022	204
SMO37860	168	SMO30123	345
SMO38061	280	SMO30124	178
SMO38162	89.4	SMO31025	67.6
SMO38263	174	SMO31026	64.7
SMO38464	246		
SMO38665	114		
SMO38766	416		

**OHM CORPORATION**  
**PROJECT 13407**

## 7-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:**

[illegible]



# ECC RESULTS



SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
ST05409	31	ST08839	193
ST05510	56.8	ST08940	408
ST05611	78.5	ST09041	49.3
ST05712	36.2	ST09142	134
ST05813	22.1	ST09344	340
ST05914	174	ST09445	135
ST06015	71.4	ST09748	104
ST06116	76.8	ST09849	217
ST06217	39.7	ST10555	46.3
ST06318	196	ST10656	90
ST06419	193	ST10757	81.4
SST06520	317	ST10858	46.1
ST06621	111	ST10959	177
ST06722	191	ST11060	308
ST06823	64.7	ST11161	73.6
ST06924	31.3	ST11262	160
ST07025	69.3	ST11363	494
ST07126	107	ST11464	34.3
ST10051	16.3	ST11565	80.9
ST07327	245	ST11666	350
ST07428	108	ST11767	32.6
ST07529	150	ST11868	24.8
ST07630	15.2	ST12069	96.5
ST07731	74.4	ST12170	5.6
ST07832	318	ST12271	348
ST10152	47.1	ST12372	16.1
ST08033	65.5	ST12973	51.1
ST010253	22.7		
ST010454	14.2		
ST08334	30.9		
ST08435	424		
ST08536	153		
ST08637	12.7		
ST08738	83.5		

**OHM CORPORATION**  
**PROJECT 13407**

## RE-CHARACTERIZATION SAMPLING RESULTS

**DATE NAME:**

[illegible]

# ECC RESULTS

~~100/201 HILL~~

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
SH04919	29.2		
SH05020	16.2		
SH05121	10.5		
SH05222	13.9		
SH02305	311		
SH02406	163		
SH6333	17.5		
SH05424	238		
SH05525	201		
SH05626	48.5		
SH02810	13		
SH03012	130		
SH05727	143		
SH05828	37.8		
SH05929	27.8		
SH06030	15.5		
SH03517	204		
SH03618	458		
SH03734	164		
SH06131	177		
SH06232	17.1		
SH04035	69.9		
SH04136	113		
SH04237	134		
SH04338	156		
SH04439	284		
SH04540	166		
SH04641	175		
SH04742	136		
SH04843	168		

**OHM CORPORATION**  
**PROJECT 13407**

**PRE-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED]

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
SHA001	351	
SHA002	266	
SHA003	513	
SHA004	47	
SHA005	44	
SHA006	45	
SHA007	53	
SHA008	53	
SHA009	36	
SHA010	89	
SHA011	65	
SHA012	ND	
SHA013	104	
SHA014	51	
SHA015	2298	
SHA016	59	
SHA017	246	
SHA018	167	
SHA019	4815	
SHA020	325	
SHA021	3100	
SHA022	192	
SHA023	132	
SHA024	21	
SHA025	146	
SHA026	88	
SHA027	586	
SHA028	158	
SHA029	ND	
SHA030	189	
SHA031	ND	
SHA032	95	
SHA033	ND	
SHA034	559	
SHA035	385	
SHA036	245	
SHA037	160	
SHA038	226	
SHA039	458	
SHA040	517	
SHA041	637	
SHA042	1416	
SHA043	244	
SHA044	195	
SHA045	33	
SHA046	22	
SHA047	ND	
SHA048	123	
SHA049	142	
SHA050	76	
SHA051	188	

# ECC RESULTS

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
SHA067	*		
SHA06805	306		
SHA069	*		
SHA07006	360		
SHA07107	215		
SHA07208	284		
SHA07309	14.2		
SHA07410	178		
SHA07511	*		
SHA07612	411		
SHA077	*		
SHA07813	83		
SHA07914	397		
SHA08015	14.9		
SHA081	*		
SHA10231	96.4		
SHA08316	93.8		
SHA08417	114		
SHA08518	325		
SHA08619	52.8		
SHA08720	137		
SHA08821	196		
SHA08922	167		
SHA09023	39.4		
SHA09124	202		
SHA09225	279		
SHA09326	12.7		
SHA09427	40		
SHA09528	33.5		
SHA09629	21.7		
SHA09730	136		

\* SAMPLE POINTS 1, 3, AND 5 WERE NOT COLLECTED FOR CONFIRMATION DUE TO THE DISCOVERY OF THE LANDFILL. THE EXCAVATION WAS HALTED PER USACE

SAMPLE POINTS 9, 10, 11, AND 15 WERE NOT COLLECTED FOR CONFIRMATION SINCE THE AREA WAS TO BE CAPPED WITH CLAY.

**OHM CORPORATION**  
**PROJECT 13407**

**LEAD-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME: ABBOTT ALLEY**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
SA001	35.9	
SA002	24.6	
SA003	28.2	
SA004	27.9	
SA005	10	
SA006	11.2	
SA007	45.3	
SA008	63.2	
SA009	324	
SA010	37.3	
SA011	49.7	
SA012	30.6	
SA013	4590	
SA014	2620	
SA015	280	
SA016	237	

## ECC RESULTS ABBOTT ALLEY

[illegible]

**ABBOTT ALLEY WAS CAPPED PER USAGE  
DUE TO DEPTH REACHED**

**OHM CORPORATION  
PROJECT 13407**

## E-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME: WEBER ALLEY**

[illegible]



# ECC RESULTS

## WEBER AVENUE

[illegible]

DUE TO DEPTH REACHED IN EXCAVATION AND LABORATORY RESULTS ALL WAS CAPPED WITH 8" OF CONCRETE. THEREFORE CONFIRMATION RESULTS WERE NOT NECESSARY.

**OHM CORPORATION  
PROJECT 13407**

## CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:**

[illegible]

# ECC RESULTS



SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S2T030	76.4	S2T067	*
S2T031	351	S2T068	*
S2T033	74.1	S2T118	364
S2T034	477	S2T123	190
S2T075	203	S2T124	14.7
S2T076	87.4	S2T125	227
S2T037	ND	S2T127	10.6
S2T038	99.3	S2T128	14.7
S2T039	384		
S2T081	*		
S2T041	161		
S2T042	365		
S2T078	85.7		
S2T079	40.3		
S2T082	23.1		
S2T083	48.3		
S2T084	16.3		
S2T114	15.4		
S2T115	6		
S2T087	13.2		
S2T088	27.4		
S2T089	109		
S2T116	161		
S2T054	130		
S2T055	258		
S2T091	272		
S2T092	134		
S2T120	8.7		
S2T095	15.5		
S2T061	174		
S2T119	288		
S2T063	281		
S2T064	271		
S2T066	*		

## 7-CHARACTERIZATION SAMPLING RESULTS

■■■■■■■■■■

[illegible]

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[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

## 7-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:**

[illegible]

\_\_\_\_\_

8-19

**OHM CORPORATION**  
**PROJECT 13407**

## CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** [REDACTED] CLEVELAND

[illegible]



**██████████ CLEVELAND**

8-21

**OHM CORPORATION  
PROJECT 13407**

## E-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** [REDACTED] DELMAR

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
SDR001	584	
SDR002	80	
SDR003	177	
SDR004	19	
SDR005	626	
SDR006	102	
SDR007	519	
SDR008	135	
SDR009	236	
SDR010	84	
SDR011	601	
SDR012	67	
SDR023	386	0.3
SDR024	149	0.14
SDR025	391	0.19
SDR026	830	6.9
SDR027	348	0.081

[illegible]

**DELMAR**

8-23

**OHM CORPORATION  
PROJECT 13407**

**IE-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED] **TERRY**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
<b>S102-038</b>	<b>369</b>	<b>11.9</b>
<b>S102-039</b>	<b>47.1</b>	
<b>S102-040</b>	<b>94.1</b>	<b>0.021</b>
<b>S102-041</b>	<b>54.6</b>	
<b>S102-043</b>	<b>88.4</b>	<b>BDL</b>
<b>S102-044</b>	<b>60.8</b>	
<b>S102-046</b>	<b>NL</b>	<b>BDL</b>
<b>S102-047</b>	<b>27.5</b>	
<b>S102-049</b>	<b>133</b>	<b>BDL</b>
<b>S102-050</b>	<b>115</b>	

# ECC RESULTS

TERRY

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S102-106	27.9	S102-156	11.1
S102-017	112	S102-157	25
S102-108	174	S102-158	11.5
S102-109	128	S102-159	11.8
S102-110	52	S102-160	28.1
S102-111	50.6	S102-161	57.1
S102-112	25.2	S102-162	28.2
S102-113	14.4	S102-163	67
S102-114	108	S102-164	117
S102-115	179	S102-165*	9.7
S102-116	80	S102-166*	23.3
S102-117	19.3	S102-167*	20.4
S102-118	66.6		
S102-119	14.1		
S102-120	166		
S102-121	87.7		
S102-122	14.2		
S102-123	40.6		
S102-124	85.8		
S102-125	47		
S102-126	180		
S102-127	189		
S102-128	8.8		
S102-129	77.6		
S102-130A	138		
S102-131	13.9		
S102-132	40.6		
S102-133	186		
S102-134	26.5		
S102-135	34.5		
S102-136A	148		
S102-137	36.7		
S102-138	142		
S102-139	176		
S102-140	18.6		
S102-141	31.4		
S102-142A	198		
S102-143	30.5		
S102-144	29.7		
S102-145*	105		
S102-146*	156		
S102-147	30		
S102-148	16.6		
S102-149	35.4		
S102-150	11.1		
S102-151	8		
S102-152	41.2		
S102-153	60.6		
S102-154	21.9		
S102-155	28.8		

\*DENOTES DUPLICATE

TABLE 6.3 PERIMETER MONITORING RESULTS			
Date	Location	Reading (mg/m <sup>3</sup> )	Activity
6/23/93	[REDACTED]	0.0004 (upwind)	Excavating
6/29/93	[REDACTED] e	0.0009 (upwind)	Excavating
6/29/93	[REDACTED]	0.0009 (upwind)	Excavating



## 7.0 QUANTITY SUMMARY TABLES

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**OHM CORPORATION**  
**PROJECT 13407**

### 3-CHARACTERIZATION SAMPLING RESULTS

SITE NAME [illegible]



# ECC RESULTS

## ALLEY 44

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S044-105	159	S044-153A	437
S044-106	294	S044-153B	94.2
S044-107	296	S044-154D	20
S044-107A	49.5	S044-155A	20.1
S044-108	220	S044-156A	210
S044-109	80.9	S044-157B	11.3
S044-110A	28.8	S044-158	161
S044-111	204	S044-158A	61
S044-112	60.8	S044-159A	54.3
S044-114	57.8	S044-160A	11.9
S044-115A	8.8	S044-161A	174
S044-116	32.4	S044-162A	21.1
S044-117	39.6	S044-163A	5.6
S044-119A	194	S044-164	103
S044-120	65.3	S044-164A	53.7
S044-121	67.3	S044-165A	88.7
S044-122	12.8	S044-166	201
S044-123A	147	S044-166A	103
S044-124A	234	S044-167A	17.6
S044-125	121	S044-168A	40.9
S044-127	168	S044-169A	6.4
S044-128	134	S044-172*	161
S044-129A	31.6	S044-173*	237
S044-130	166	S044-174*	177
S044-131	175	S044-180*	23.7
S044-132	290	S044-181*	50.4
S044-133	125		
S044-134B	10.9		
S044-135	188		
S044-136A	446		
S044-136C	45.5		
S044-137A	351		
S044-138	179		
S044-139A	333		
S044-139B	201		
S044-140A	64.7		
S044-141B	76.5		
S044-142D	52.9		
S044-143A	201		
S044-144A	390		
S044-144B	27		
A044-145	154		
A044-146B	113		
S044-147C	23.7		
S044-148A	111		
S044-149C	226		
S044-150B	250		
S044-151	251		
S044-152A	373		
S044-152D	30.6		

\*DENOTES DUPLICATE SAMPLE

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED]

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S101-001	44.6	BDL
S101-002	41.7	
S101-004	22.2	BDL
S101-105	38.7	
S101-107	16.8	BDL
S101-108	29.9	
S101-010	45.5	BDL
S101-011	11.3	
S101-013	151	BDL
S101-014	41.3	

**WATSON**

\*DENOTES DUPLICATE SAMPLE

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** Alley 45

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S45-001	1910	5.7
S45-002	52.8	
S45-004	25600	40.2
S45-005	525	
S45-007	804	0.075
S45-008	880	
S45-010	129	0.014
S45-011	68.7	
S45-013	60.2	BDL
S45-014	85.2	

**ECC RESULTS**  
**ALLEY 45**

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S045-108	25.6	S045-158A	35.2
S045-109	11.8	S045-159B	28.8
S045-110	35.4	S045-160A	225
S045-111	16.9	S045-161B	296
S045-112	98.7	S045-162B	99.2
S045-113	22.6	S045-163B	21.8
S045-114	33.9	S045-164	123
S045-115	100	S045-165A	18.4
S045-116	6.4	S045-166A	114
S045-117A	6.9	S045-167	283
S045-118	14.7	S045-168	78.1
S045-119	30.7	S045-169	23.2
S045-120	136	S045-170	ND
S045-121	30.4	S045-171	10.5
S045-122	53.3	S045-172	117
S045-123	146	S045-173	27.3
S045-124	29.4	S045-174	11
S045-125	12.1	S045-175	187
S045-126A	25.4	S045-176	4.3
S045-127	151	S045-177	86.4
S045-128	13.5	S045-178	87.5
S045-129	90.8	S045-179	13.9
S045-030	149	S045-180	5.8
S045-131	89	S045-181	327
S045-132	400	S045-182	22.7
S045-133	119	S045-183	13.8
S045-134	ND	S045-184	321
S045-135	169	S045-185	21.7
S045-136	18.4	S045-186	28.4
S045-137	9.9	S045-187	3.7
S045-138A	112	S045-188	3.1
S045-139	13.8	S045-200*	100
S045-140	163	S045-201*	4.4
S045-141	12.8	S045-202*	41.8
S045-142	37.4	S045-204*	56.1
S045-143	9.1	S045-205*	12.7
S045-144	126	S045-206*	328
S045-145	23.8	S045-208*	342
S045-146	9.7		
S045-147	63		
S045-148	25		
S045-149	11.2		
S045-150	108		
S045-151A	128		
S045-152	238		
S045-153A	86.7		
S045-154A	38.2		
S045-155A	16		
S045-156	112		
S045-157A	414		

\*DENOTES DUPLICATE SAMPLE

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED] **CARVER**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S103-100	259	162
S103-104	141	249
S103-108	153	55.5
S103-112	1290	2080
S103-116	535	134
S103-117	3300	2900
S103-118	1690	1810
S103-119	224	1100
S103-120	314	14
S103-121	212	120
S103-122	27500	20900
S103-123	258	71.4

# ECC RESULTS

**CARVER**

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S103A-016	264		
S103A-017	126		
S103A-018	46.4		
S130A-019	49.9		
S103A-020	74.1		
S103A-021	195		
S103A-022	137		
S103A-023	297		
S103A-024	190		
S103A-025B	21.1		
S103A-026	62		
S103-200*	45.4		
S103A-201*	187		
S103B-013A	26.2		
S103B-014	246		
S103B-015	269		
S103B-016A	27.8		
S103B-17A	23.3		
S103B-018	96.3		
S103B-019A	135		
S103B-020A	41.8		
S103B-021	12.5		
S103B-022	298		
S103C-016	281		
S103C-017	111		
S103C-018	165		
S103C-019	142		
S103-020	96		
S103C-021	83.4		
S103C-022B	59.7		
S103C-023	96.1		
S103B-024	68.4		
S103C-025	199		
S103C-026	56.5		
S103C-027	11.8		
S103C-028	28.5		
S103C-029	10.3		
S103C-030B	175		
S103C-031	137		
S103C-033A	61.7		
S103C-034	139		
S103C-035	106		
S103C-036	491		
S103C-037	97.2		
S103C-038B	44.5		
S103C-039A	99		
S103C-040A	76.2		
S103C-200*	88.8		

\*DENOTES DUPLICATE SAMPLE

**OHM CORPORATION**  
**PROJECT 13407**

**RE-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME: ALLEY 27**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
<b>S027-100</b>	<b>243</b>	<b>592</b>
<b>S027-101</b>	<b>10100</b>	<b>8340</b>
<b>S027-102</b>	<b>619</b>	<b>58.3</b>
<b>S027-103</b>	<b>574</b>	<b>22.4</b>
<b>S027-104</b>	<b>414</b>	<b>14</b>



# **ECC RESULTS** **ALLEY 27**

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S027-108	66.9	S027-168A	19.5
S027-109	103	S027-169A	160
S027-110	46	S027-170	167
S027-111	90	S027-170A	23.8
S027-112	261	S027-171A	30.8
S027-113	180	S027-172A	122
S027-114	32.5	S027-173A	127
S027-115	95.4	S027-174A	22.6
S027-116	12.4	S027-175A	26.7
S027-117	104	S027-176	145
S027-118	112	S027-176A	57.6
S027-119	34.1	S027-177A	22.4
S027-120	55.8	S027-178A	35
S027-121	76.2	S027-179A	200
S027-122B	27.3	S027-180A	9.7
S027-123B	27.1	S027-181A	33.7
S027-124A	31	S027-182A	39.4
S027-125A	32.8	S027-183A	11.5
S027-126A	244	S027-184A	26.8
S027-127	28.9	S027-185C	130
S027-128A	102	S027-186A	20.7
S027-129A	77.7	S027-187	63.8
S027-130	182	S027-187A	11.8
S027-131	284	S027-188A	30.3
S027-132A	13.5	S027-189B	124
S027-133A	17.4	S027-190A	12.2
S027-134A	64.6	S027-191A	71.8
S027-135A	13.4	S027-192A	15.6
S027-136	211	S027-193	48
S027-137A	48	S027-193A	29.1
S027-138A	22.1	S027-194	161
S027-139	110	S027-194	114
S027-140A	110	S027-195	145
S027-141	80.8	S027-195A	23.5
S027-142A	19.3	S027-196	39.4
S027-143A	157	S027-196A	19.9
S027-144	89.2	S027-197A	68.2
S027-145A	18.2	S027-198	61.3
S027-146	141	S027-198A	36.4
S027-147	71.2	S027-199	94.9
S027-148	57.7	S027-199A	21.8
S027-149	90.9	S027-300A	90.8
S027-150	32.1	S027-301	154
S027-151	39.1	S027-301A	5.4
S027-152	131	S027-302A	144
S027-153A	15.2	S027-303	63.3
S027-154A	73	S027-303A	108
S027-155A	15.5	S027-202*	107
S027-156	70.5	S027-206*	172
S027-156A	18.2	S027-207*	17.3
S027-157A	39.5	S027-214*	19.7
S027-158A	98.5	S027-215*	85.4
S027-159A	93	S027-216*	21.1
S027-161A	44.4	S027-217*	23.5
S027-162A	158	S027-218*	46.7
S027-163A	30.7	S027-219*	35.7
S027-164A	51.7	S027-220*	10.8
S027-165A	22.7	S027-221*	52.4
S027-166A	30.7		
S027-167A	47.9		

\*DENOTES DUPLICATE SAMPLE

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME: ALLEY 28**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
<b>S028-100</b>	<b>83.4</b>	<b>64.2</b>
<b>S028-101</b>	<b>398</b>	<b>46.7</b>
<b>S028-102</b>	<b>2530</b>	<b>610</b>
<b>S028-103</b>	<b>2310</b>	<b>994</b>
<b>S028-104</b>	<b>601</b>	<b>57.5</b>

**ECC RESULTS**  
**ALLEY 28**

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S028-105A	25	S028-156A	19.5
S028-106	188	S028-157	60.1
S028-107	83.9	S028-158A	72.7
S028-108	16.4	S028-159	187
S028-109	231	S028-160A	89.3
S028-110A	55.7	S028-161A	22.1
S028-111	98.5	S028-162	133
S028-112	206	S028-163	185
S028-113A	129	S028-164	270
S028-114	277	S028-165	157
S028-115A	199	S028-166A	22.1
S028-116	91	S028-167A	22.8
S028-117	254	S028-168B	58.3
S028-118A	45.5	S028-169A	34.5
S028-119B	151	S028-170A	175
S028-120B	44.3	S028-171	267
S028-121	96.4	S028-172A	71.6
S028-122	440	S028-173A	27.9
S028-123	107	S028-174	182
S028-124A	210	S028-175A	26.9
S028-125A	129	S028-176	293
S028-126A	189	S028-177A	16.3
S028-127	202	S028-178	217
S028-128A	162	S028-179A	164
S028-129A	133	S028-180	23.4
S028-130	229	S028-181	181
S028-131A	48.2	S028-182	207
S028-132A	105	S028-183	100
S028-133A	102	S028-184	231
S028-134A	249	S028-185	113
S028-135A	184	S028-186	186
S028-136	21.3	S028-187	50.2
S028-137C	28.2	S028-188A	222
S028-138A	92.9	S028-189A	14.1
S028-139A	202	S028-190	123
S028-140A	77.8	S028-191A	8.8
S028-141A	157	S028-192	76.6
S028-142B	283	S028-200*	102
S028-143A	79.4	S028-201*	235
S028-144A	23.1	S028-202*	182
S028-145A	286	S028-205*	66.9
S028-146B	10.3	S028-208*	206
S028-147A	133	S028-209*	176
S028-148	174	S028-210*	32.4
S028-149A	50.4	S028-211*	20.5
S028-150A	15.2	S028-212*	15.4
S028-151	263	S028-214*	42.4
S028-153	251		
S028-154	236		
S028-155A	10		

\*DENOTES DUPLICATE

**ECC RESULTS**  
**ALLEY 28**

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S028-105A	25	S028-156A	19.5
S028-106	188	S028-157	60.1
S028-107	83.9	S028-158A	72.7
S028-108	16.4	S028-159	187
S028-109	231	S028-160A	89.3
S028-110A	55.7	S028-161A	22.1
S028-111	98.5	S028-162	133
S028-112	206	S028-163	185
S028-113A	129	S028-164	270
S028-114	277	S028-165	157
S028-115A	199	S028-166A	22.1
S028-116	91	S028-167A	22.8
S028-117	254	S028-168B	58.3
S028-118A	45.5	S028-169A	34.5
S028-119B	151	S028-170A	175
S028-120B	44.3	S028-171	267
S028-121	96.4	S028-172A	71.6
S028-122	440	S028-173A	27.9
S028-123	107	S028-174	182
S028-124A	210	S028-175A	26.9
S028-125A	129	S028-176	293
S028-126A	189	S028-177A	16.3
S028-127	202	S028-178	217
S028-128A	162	S028-179A	164
S028-129A	133	S028-180	23.4
S028-130	229	S028-181	181
S028-131A	48.2	S028-182	207
S028-132A	105	S028-183	100
S028-133A	102	S028-184	231
S028-134A	249	S028-185	113
S028-135A	184	S028-186	186
S028-136	21.3	S028-187	50.2
S028-137C	28.2	S028-188A	222
S028-138A	92.9	S028-189A	14.1
S028-139A	202	S028-190	123
S028-140A	77.8	S028-191A	8.8
S028-141A	157	S028-192	76.6
S028-142B	283	S028-200*	102
S028-143A	79.4	S028-201*	235
S028-144A	23.1	S028-202*	182
S028-145A	286	S028-205*	66.9
S028-146B	10.3	S028-208*	206
S028-147A	133	S028-209*	176
S028-148	174	S028-210*	32.4
S028-149A	50.4	S028-211*	20.5
S028-150A	15.2	S028-212*	15.4
S028-151	263	S028-214*	42.4
S028-153	251		
S028-154	236		
S028-155A	10		

\*DENOTES DUPLICATE

**OHM CORPORATION**  
**PROJECT 13407**

**PRE-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED] **CARVER**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S125-001	69.1	
S125-002	102	
S125-004	2290	
S125-005	108	
S125-007	133	
S125-008	55.5	
S125-010	77.2	
S125-011	101	
S125-013	1160	
S125-014	441	

**CARVER**

\* DENOTES DUPLICATE

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME** ALLEY 21

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S21-001	1380	1
S21-002	807	
S21-004	418	0.39
S21-005	294	
S21-007	604	28
S21-008	364	
S21-010	204	0.005
S21-011	276	
S21-013	22500	112
S21-014	993	

**ECC RESULTS  
ALLEY 21**

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S021-105	125	S021-153	218
S021-106	88.4	S021-154	278
S021-107A	118	S021-155	243
S021-108	20	S021-156A	328
S021-109	54	S021-157A	44.2
S021-110	106	S021-158	239
S021-111	120	S021-159A	228
S021-112	33.4	S021-160	265
S021-113	168	S021-161C	27.3
S021-114	117	S021-162B	47.4
S021-115	118	S021-163	293
S021-116	56.5	S021-164A	141
S021-117	41.5	S021-165A	30.5
S021-118	29.2	S021-166D	60.8
S021-119A	32.5	S021-167A	319
S021-120	133	S021-168	269
S021-121	118	S021-169	161
S021-122A	312	S021-170A	282
S021-123	62.1	S021-171	162
S021-124	170	S021-200*	49.1
S021-125B	50.8	S021-202*	126
S021-126	99.9	S021-206*	343
S021-127	265	S021-207*	128
S021-128B	17.7	S021-208*	40.9
S021-129	64.9		
S021-130	78		
S021-131A	255		
S021-132	277		
S021-133	297		
S021-134	296		
S021-135	39		
S021-136	116		
S021-137A	175		
S021-138	30.5		
S021-139A	19		
S021-140A	18.4		
S021-141A	103		
S021-142	106		
S021-143	524		
S021-143A	247		
S021-144	78.5		
S021-145	39.8		
S021-146A	34.6		
S021-147	372		
S021-148	32.4		
S021-149B	18.6		
S021-150	118		
S021-151	90.4		
S021-152B	252		

\* DENOTES DUPLICATE



**OHM CORPORATION**  
**PROJECT 13407**

## CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** ALLEY 16

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S16-001	5150	9
S16-002	133	
S016-004	979	0.57
S16-005	459	
S16-007	9490	7.1
S16-008	263	
S16-010	370	3.5
S16-011	875	
S16-013	1460	0.37
S16-014	66.4	

# ECC RESULTS

## ALLEY 16

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S016-100	12.2	S016-134A	7.6
S016-100A	5.6	S016-135	71.5
S016-101	56.7	S016-135A	11.4
S016-101A	8.4	S016-136A	49.2
S016-102A	6	S016-137	196
S016-103	61	S016-137A	14.1
S016-103A	10.8	*S016-138	168
S016-104	15.1	S016-138A	8.8
S016-104A	13.6	S016-139	293
S016-105	313	S016-139A	13.4
S016-105A	49.8	S016-140A	5.6
S016-106A	21.4	S016-141	64.4
S016-107	194	S016-141A	8.7
S016-107A	14.8	S016-142A	12.8
S016-108A	26.4	S016-143	100
S016-109	90.9	S016-143A	7
S016-109A	201	S016-144	1430
S016-110	312	S016-144A	17.5
S016-110A	7.9	S016-145	151
S016-111A	175	*S016-145A	86.6
S016-112A	92.3	S016-146	47.1
S016-113C@	DEPTH	S016-146A	18.9
*S016-114	47.4	S016-147	34.9
S016-114A	47.6	*S016-148	75.4
S016-115A	89	S016-149	40.1
S016-116A	16.1	S016-150	54.7
S016-117A	274	S016-151	10.2
S016-118A	117	S016-152	6.2
S016-119A	9.9	S016-153B@	DEPTH
S016-020A	106	S016-154	11.8
S016-021A	19.7	S016-155	46.1
S016-022A	40.2	S016-156	40.5
S016-123	97.3	S016-157	49.6
S016-123A	40.3	S016-158	48.2
S016-124A	270	S016-159	76
S016-125A	23.8	S016-160	34.1
S016-126	180	S016-161	18.1
S016-126A	9	S016-162	102
*S016-127	108	S016-163	97.8
S016-127A	16	S016-164	98.8
S016-128	232	S016-165	109
S016-128A	106	S016-166	141
*S016-129	121	S016-167	89.8
S016-129A	74.8	*S016-204	7.7
S016-130A	9.9	*S016-205	154
S016-131A	11	*S016-206	9.8
S016-132	66.8	*S016-207	9.9
S016-132A	11.8	*S016-208	53.9
S016-133A	57.1	*S016-209	86.9

\* DENOTES DUPLICATION

@DENOTES THAT MAXIMUM DEPTH FOR USAGE WAS REACHED

OHM CORPORATION  
PROJECT 13407

E-CHARACTERIZATION SAMPLING RESULTS

SITE NAME: [REDACTED] NIEDRINGHAUS

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S822-C001	72.7	BDL
S822-C002	119	
S822-C003	69.9	BDL
S822-C004	56.3	0.21
S822-C005	306	0.37
S822-C006	125	
S822-C007	304	BDL
S822-C008	201	
S822-C009	267	BDL
S822-C010	187	

**OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94**

**SITE NAME:** [REDACTED]

**STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.**

**PRE-DETERMINED DEPTH: 6"**

OHM CORPORATION  
PROJECT 13407

RE-CHARACTERIZATION SAMPLING RESULTS

SITE NAME [REDACTED] STATE

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
1408-C00	741	BDL
1408-C00	731	
1408-C00	727	BDL
1408-C00	600	
1408-C00	607	BDL
1408-C00	1940	
1408-C00	647	BDL
1408-C00	636	
1408-C00	580	242
1408-C01	278	

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME:



STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"

**OHM CORPORATION**  
**PROJECT 13407**

## RE-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME** [REDACTED] **GRAND**

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S1410C-001		0.51
S1410C-002		0.27
S1410C-003		0.34
S1410C-004		0.19
S1410C-005		0.16
S1410C-006		0.45
S1410C-007		0.28
S1410C-008		0.45
S1410C-009		0.3
S1410C-010		4

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, II  
12/6/94

SITE NAME: [REDACTED]

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"



**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME** [REDACTED] **GRAND**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S1442-100	1070	
S1442-101	522	
S1442-102	163	
S1442-103	390	
S1442-104	964	
S1442-105	662	
S1442-106	1240	
S1442-107	691	
S1442-108	792	
S1442-109	5740	

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME: 

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"

**OHM CORPORATION**  
**PROJECT 13407**

## E-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** [REDACTED] DELMAR

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
1630-100A	2280	
1630-100B	1460	
1630-100C	760	
1630-200A	1390	
1630-200B	1360	
1630-200C	307	

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME: [REDACTED]

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED] **GRAND**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S1443-100	711	
S1443-101	307	
S1443-102	816	
S1443-103	279	
S1443-104	443	
S1443-105	162	
S1443-106	689	
S1443-107	340	
S1443-108	719	
S1443-109	1740	

OHM CORPORATION  
PROJECT 13407

IE-CHARACTERIZATION SAMPLING RESULTS

SITE NAME: █████ CLEVELAND

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S1642-C001		1.6
S1642-C002		0.6
S1642-C003		0.21
S1642-C004		BDL
S1642-C005		0.4
S1642-C006		BDL
S1642-C007		0.38
S1642-C008		BDL
S1642-C009		0.25
S1642-C010		BDL

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME: 

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"

**OHM CORPORATION**  
**PROJECT 13407**

**RE-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME** [REDACTED] **CLEVELAND**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S1640-C001		0.91
S1640-C002		0.71
S1640-C003		0.75
S1640-C004		0.31
S1640-C005		0.95
S1640-C006		0.2
S1640-C007		0.42
S1640-C008		0.22
S1640-C009		BDL
S1640-C010		BDL



OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME [REDACTED]

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 6"

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED] **MADISON**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S1429-037		895
S1429-039		549
S1429-040		569
S1429-041		313
S1429-043		879
S1429-044		305
S1429-046		893
S1429-047		954
S1429-049		853
S1429-050		657

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME: [REDACTED]

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"

**OHM CORPORATION**  
**PROJECT 13407**

## RE-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** [REDACTED] DELMAR

[illegible]

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME: [REDACTED] DELMAR

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 6"

OHM CORPORATION  
PROJECT 13407

LE-CHARACTERIZATION SAMPLING RESULTS

SITE NAME: [REDACTED] GRAND

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S1440-001	727	0.2
S1440-002	403	
S1440-004	1020	0.33
S1440-005	242	
S1440-007	677	0.37
S1440-008	528	
S1440-010	859	0.19
S1440-011	590	
S1440-013	444	0.18
S1440-014	531	

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IN  
12/6/94

SITE NAME: [REDACTED] GRAND

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"

**OHM CORPORATION**  
**PROJECT 13407**

## RE-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** [REDACTED] EDISON

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
1643-100A	1630	
1643-100B	1400	
1643-100C	454	
1643-200A	1350	
1643-200B	345	
1643-200C	262	



OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
12/6/94

SITE NAME: [REDACTED]

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 6"

**OHM CORPORATION**  
**PROJECT 13407**

## RE-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** [REDACTED] GRAND

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S1444-001	1540	0.68
S1444-002	983	
S1444-004	1490	0.74
S1444-005	1570	
S1444-007	1890	0.94
S1444-008	1230	
S1444-010	655	0.18
S1444-011	440	
S1444-013	1580	0.46
S1444-014	2300	

OEM CORPORATION  
PROJECT 13407  
GRANITE CITY, II  
12/6/94

SITE NAME: [REDACTED]

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OEM BY USACE.

PRE-DETERMINED DEPTH: 12"


**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED] **MADISON**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
1423-100A	2040	
1423-100A	1940	
1423-100B	809	
1423-100B	715	
1423-100C	570	
1423-100C	235	
1423-200A	1130	
1423-200B	1670	
1423-200C	171	

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY IL  
12/6/94

SITE NAME:  MADISON

STACK EMISSION SITES WERE NOT SAMPLED FOR  
VERIFICATION DUE TO THE FACT THAT A PRE-DETERMINED  
DEPTH FOR EXCAVATION WAS GIVEN TO OHM BY USACE.

PRE-DETERMINED DEPTH: 12"

**OHM CORPORATION**  
**PROJECT 13407**

## PRE-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** ALLEY 50

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S53-001	647	0.02
S53-002	245	
S53-004	259	0.0071
S53-005	7.8	
S53-007	42.5	BDL
S53-008	72.7	
S53-010	1120	0.096
S53-011	15.8	
S53-013	143	0.034
S53-014	216	

**ECC RESULTS  
ALLEY 53**

SECTION NUMBER	RESULTS MG/KG
S053 0102	25
S053 0202	118
S053 0302	165
S053 0401	307
S053 0501	90
S053 0601	238
S053 0701	167
S053 0801	70
S053 0901	166
S053 1001	82
S053 1102	219
S053 1202	165
S053 1302	246
S053 140	198
S053 150	300
S053 160	152
S053 170	365
S053 180	124
S053 190	206
S053 200	448
S053 210	197
S053 220	175
S053 230	313
S053 240	289

**OHM CORPORATION**  
**PROJECT 13407**

## RE-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** ALLEY 49

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S49-001	377	0.008
S49-002	408	
S49-004	4300	18.2
S49-005	42.4	
S49-007	741	0.055
S49-008	122	
S49-010	118	0.42
S49-011	142	
S49-013	215	0.23
S49-014	56.1	



# ECC RESULTS

## ALLEY 49

### SECTION NUMBER RESULTS MG/KG

S049-0101	218
S049-0201	162
S049-0303	72.2
S049-0403	214
S049-0503	24.4
S049-0603	53
S049-0702	108
S049-0801	173
S049-0901	14.9
S049-1001	83.3
S049-1101	36.6
S049-1201	485
S049-1302	81.5
S049-1402	22.5
S049-1501	38.3
S049-1601	193 DUP 126
S049-1701	28.6
S049-1801	27.1
S049-1901	173
S049-2001	143
S049-2101	29.9

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME** ALLEY 62

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S62-001	0.11	
S62-002	749	
S62-004	596	
S62-005	54.9	
S62-007	803	
S62-008	222	
S62-010	417	
S62-011	974	
S62-013	0.08	
S62-014	218	

**ECC RESULTS**  
**ALLEY 062**

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** ALLEY 6

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S06-001	4680	20.6
S06-002	4030	
S06-004	338	0.85
S06-005	182	
S06-007	2270	4.5
S06-008	683	
S06-010	713	0.5
S06-011	1040	
S06-013	2720	3.7
S06-014	24.8	

# ECC RESULTS ALLEY 6

SECTION NUMBER	RESULTS MG/KG
S006 0104	58.9
S006 0203	157
S006 0303	70.1
S006 0402	54.6
S006 0502	17.1
S006 0601	202
S006 0702	9.7
S006 0801	234
S006 0902	8.6
S006 1001	222
S006 1103	13
S006 1203	107
S006 1302	244
S006 1401	37.8
S006 1501	20.3
S006 1601	167
S006 1701	429
S006 1801	216

**OHM CORPORATION**  
**PROJECT 13407**

## E-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** ALLEY 75

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S07.5-001	8510	18
S07.5-002	279	
S07.5-004	3980	57
S07.5-005	655	
S07.5-007	1590	0.34
S07.5-008	411	
S07.5-010	1200	19
S07.5-011	157	
S07.5-013	624	0.18
S07.5-014	127	

## ECC RESULTS

### ALLEY 7.5

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

**I-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** ALLEY 65

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S65-001	17	BDL
S65-002	21.6	
S65-004	165	BDL
S65-005	136	
S65-007	900	0.14
S65-008	141	
S65-010	315	BDL
S65-011	284	
S65-013	774	0.13
S65-014	139	



## ECC RESULTS

### ALLEY 65

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

**LEAD-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME** ALLEY 65.5

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S65.5-001	89.4	BDL
S65.5-002	75.9	
S65.5-004	718	0.11
S65.5-005	421	
S65.5-007	1810	3.6
S65.5-008	680	
S65.5-010	177	0.11
S65.5-011	170	
S65.5-013	161	0.12
S65.5-014	307	

ALLEY 65.5 WAS NOT SAMPLED FOR CONFIRMATION DUE TO THE FACT THAT EXCAVATION WAS STOPPED DUE TO DEPTH OF 6' THAT WAS REACHED. OHM WAS DIRECTED TO STOP EXCAVATION BY USACE.

ECC RESULTS  
ALLEY 62.5

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

**(E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME** ALLEY 13

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S13-001	12000	4.3
S13-002	241	
S13-004	363	0.1
S13-005	35.3	
S13-007	486	0.11
S13-008	425	
S13-010	40.5	BDL
S13-011	40.3	
S13-013	6170	0.3
S13-014	1120	

# **ECC RESULTS** **ALLEY 13**

SECTION NUMBER	RESULTS MG/KG
S013 0101	170
S013 0201	144
S013 0301	151
S013 0401	42.5
S013 0501	40
S013 0601	41
S013 0701	24.4
S013 0801	46
S013 0901	229
S013 1001	29
S013 1101	19
S013 1201	13.5
S013 1301	45.3
S013 1401	11.1
S013 1501	27.5
S013 1601	80
S013 1701	324
S013 1801	136

**OHM CORPORATION**  
**PROJECT 13407**

**-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED] **MARKET:**

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S104-037	185	0.043
S104-038	98.4	
S104-040	4450	6.5
S104-041	750	
S104-043	475	0.15
S104-044	330	
S104-046	454	0.12
S104-047	312	
S104-049	930	0.38
S104-050	690	

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[illegible]



OHM CORPORATION  
PROJECT 13407

CHARACTERIZATION SAMPLING RESULTS

SITE NAME [REDACTED] WATSON

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S214-001C	270	BDL
S214-002C	23	
S214-004C	252	0.25
S214-005C	136	
S214-007C	266	BDL
S214-008C	45.9	
S214-010C	202	BDL
S214-013C	221	
S214-014C	40.4	BDL

□

**WATSON**

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

**-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** [REDACTED]

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S209-001C	161	BDL
S209-002C	71.9	
S209-004C	521	BDL
S209-005C	146	
S209-007C	449	BDL
S209-008C	42.3	
S209-010C	30.5	BDL
S209-011C	11	

**██████HOLL**8-7X

**OHM CORPORATION**  
**PROJECT 13407**

**T-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME** XXXXXXXXXX **WATSON**

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S210-001C	67.9	BDL
S210-002C	25.4	
S210-004C	11.1	BDL
S210-005C	50.2	
S210-007C	37.4	0.26
S210-008C	71.3	
S210-010C	93.7	0.61
S210-011C	50.2	
S210-013C	93.3	BDL
S210-014C	21	

**WATSON**

8-80

**OHM CORPORATION**  
**PROJECT 13407**

**E-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** ALLEY 19

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S19-001	707	1.7
S19-002	201	
S19-004	9600	3.6
S19-005	151	
S19-007	645	0.085
S19-008	263	
S19-010	1000	0.033
S19-011	41.8	
S19-013	4300	3.1
S19-014	1510	

# ECC RESULTS ALLEY 19

SECTION NUMBER	RESULTS MG/KG
S019 0102	96.6
S019 0202	164
S019 0302	38.5
S019 0402	128
S019 0502	168
S019 0602	102
S019 0702	303
S019 0802	231
S019 0902	223
S019 1002	300
S019 1103	57.6
S019 1202	261
S019 1303	122
S019 1402	136
S019 1502	17.1



**HILL**

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

**LE-CHARACTERIZATION SAMPLING RESULTS**

**SITE NAME:** ALLEY 36.5

<b>SAMPLE NUMBER</b>	<b>TOTAL LEAD MG/KG</b>	<b>TCLP LEAD MG/L</b>
S36.5-001	582	0.53
S36.5-002	471	
S36.5-004	305	0.99
S36.5-005	12.8	
S36.5-007	86.6	0.66
S36.5-008	99	
S36.5-010	30.8	BDL
S36.5-011	5.4	
S36.5-013	1530	0.55
S36.5-014	26.4	

## ECC RESULTS

### ALLEY 36.5

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

## E-CHARACTERIZATION SAMPLING RESULTS

**SITE NAME:** ALLEY 54.5

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S54.5-001	64.7	BDL
S54.5-002	313	
S54.5-004	94.4	BDL
S54.5-005	55.3	
S54.5-007	413	0.1
S54.5-008	231	
S54.5-010	94.5	0.021
S54.5-011	122	
S54.5-013	135	0.052
S54.5-014	30	

## ECC RESULTS

### ALLEY 54.5

[illegible]

**TERRY**

[illegible]

**OHM CORPORATION**  
**PROJECT 13407**

## CHARACTERIZATION SAMPLING RESULTS

SITE NAME: [REDACTED] BOOKER

[illegible]

**BOOKER**

8-90



OHM CORPORATION  
PROJECT 13407

CHARACTERIZATION SAMPLING RESULTS

SITE NAME: [REDACTED] CARVER

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S212-001C	148	BDL
S212-002C	111	
S212-004C	87.9	BDL
S212-005C	37	
S212-007C	44.4	BDL
S212-008C	52.3	
S212-010C	25.1	BDL
S212-011C	25.9	

**CARVER**

8-92

**OHM CORPORATION**  
**PROJECT 13407**

### CHARACTERIZATION SAMPLING RESULTS

SITE NAME: [REDACTED] CARVER

SAMPLE NUMBER	TOTAL LEAD MG/KG	TCLP LEAD MG/L
S104-001C	224	BDL
S104-002C	48.7	
S104-004C	115	0.25
S104-005C	80.6	
S104-007C	115	BDL
S104-008C	179	
S104-010C	105	BDL
S104-011C	82.2	

**CARVER**

8-94

# ECC RESULTS

WATSON

SECTION NUMBER	RESULTS MG/KG	SECTION NUMBER	RESULTS MG/KG
S206-0101	29.8		
S206-0102	163		
S206-0301	183		
S206-0401	85.7		
S206-0501	63.5		
S206-0601	15.9		
S206-0701	8.1		
S206-0801	60.6		
S206-0901	20.7		
S206-1001	15.1		
S206-1101	66.8		
S206-1201	40		
S206-1301	21.7		
S206-1401	66.5		
S206-1501	71.4		
S206-1601	14.7		
S206-1701	55.1		
S206-1801	54.1		
S206-1901	22.8		
S206-2001	74.8		
S206-2101	64.6		
S206-2201	82.6		
S206-2301	65		
S206-2401	170		
S206-2501	120		
S206-2601	87.7		
S206-2701	134		
S206-2801	191		
S206-2901	120		
S206-3001	210		
S206-3101	165		
S206-3201	103		
S206-3301	209		
S206-3401	163		
S206-3501	366		
S206-3601	215		
S206-3701	288		
S206-3801	54.6		
S206-3901	171		
S206-4001	249		
S206-4101	136		
S206-4201	78.2		
S206-4301	154		
S206-4401	247		
S206-4501	162		
S206-4601	181		
S206-4701	162		
S206-4801	280		

# ECC RESULTS

WATSON

SECTION NUMBER	RESULTS MG/KG
S202-0101	199
S202-0201	85
S202-0301	98.9
S202-0401	108
S202-0501	93.3
S202-0601	107
S202-0701	97.4
S217-0801	121
S202-0901	275
S202-1001	324
S202-1101	176
S202-1201	131
S202-1301	99.5
S202-1401	172
S202-1501	89.1
S202-1602	51.7
S202-1701	291
S202-1801	66.4
S202-1901	50.6
S202-2001	403
S202-2101	87.3

**WATSON**

8-97

# ECC RESULTS

WATSON

SECTION NUMBER	RESULTS MG/KG
S203-0101	22.4
S203-0201	69.9
S203-0301	75
S203-0401	66.4
S203-0501	37.5
S203-0601	150
S203-0701	68.6
S203-0801	63.7
S203-0901	288
S203-1001	134
S203-1101	89.2
S203-1201	51.1
S203-1303	317
S203-1402	245
S203-1501	117
S203-1601	63.2
S203-1701	402
S203-1802	109
S203-1901	215
S203-2001	158
S203-2102	55.2
S203-2201	386
S203-2301	208
S203-2401	144



# ECC RESULTS

WATSON

SECTION NUMBER	RESULTS MG/KG
S201-0101	49.4
S201-0201	36.7
S201-0302	108
S201-0402	47.1
S201-0501	137
S201-0601	91.3
S201-0702	98.2
S201-0801	333
S201-0901	216
S201-1001	286
S201-1101	137
S201-1202	118
S201-1301	196
S201-1402	48.2
S201-1501	370
S201-1602	164
S201-1701	129
S201-1802	17.9
S201-1901	163
S201-2001	194
S201-2101	228
S201-2201	63.1
S201-2301	20.3
S201-2401	16.6

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WATSON

[illegible]

**ROOSEVELT**5

**ROOSEVELT**

8-101

[illegible]

# ROOSEVELT

[illegible]

OHM CORPORATION  
PROJECT 13407  
GRANITE CITY, IL  
03/09/95

ECC RESULTS-PUG MILL

SECTION NUMBER	RESULTS MG/L	SECTION NUMBER	RESULTS MG/L
S006-P01	BDL	S201-P05	BDL
S006-P02	BDL	S201-P06	BDL
S07.5-P01	BDL	S201-P07	BDL
S07.5-P02	BDL	S201-P08	BDL
S07.5-P03	BDL	S202-P01	BDL
S013-P01	BDL	S203-P01	BDL
S013-P02	BDL	S203-P02	BDL
S013-P03	BDL	S203-P03	BDL
S019-P01	BDL	S204-P01	0.35
S019-P02	BDL	S204-P02	0.34
S36.5-P01	BDL	S206-P01	BDL
S049-P01	BDL	S206-P02	0.37
S049-P02	BDL	S206-P03	BDL
S049-P03	0.42	S206-P04	BDL
S049-P04	BDL	S206-P05	BDL
S049-P05	BDL	S206-P06	BDL
S053-P01	BDL	S206-P07	BDL
S053-P02	BDL	S207-P01	BDL
S053-P03	BDL	S207-P02	BDL
S053-P04	BDL	S207-P03	BDL
S062-P01	BDL	S210-P01	BDL
S062-P02	BDL	S210-P02	BDL
S062-P03	BDL	S211-P01	BDL
S62.5-P01	BDL	S214-P01	BDL
S62.5-P02	BDL	S214-P02	BDL
S62.5-P03	BDL	S214-P03	BDL
S065-P01	BDL	S214-P04	BDL
S065-P02	BDL	S217-P01	0.32
S065-P03	BDL	S217-P02	BDL
S65.5-P01	BDL	S217-P03	BDL
S65.5-P02	BDL	S1217-P01	BDL
S104-P01	0.31	S1217-P02	BDL
S105-P01	BDL	OVER-P01	BDL
S105-P02	BDL	OVER-P09	BDL
S105-P03	BDL	OVER-P10	BDL
S123-P01	BDL	OVER-P11	BDL
S201-P01	BDL	OVER-P12	BDL
S201-P02	BDL	OVER-P13	BDL
S201-P03	BDL	OVER-P14	BDL
S201-P04	BDL	OVER-P15	BDL

\*BDL-BELOW DETECTION LIMITS

## **9.0 PHOTO REPRESENTATION**

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All sites in all phases of the Granite City project were documented by photographs and videocassettes. Each property was documented with before, during, and after photos and videos. The following sections are representative of the various types of work performed during Phase 1, 2, and 3. Every property is not presented in this final report to minimize the volume of paper.



### 9.1 TYPICAL ALLEY - ALLEY #53

Alley #53 represent the typical work effort for all alleys. The fence delineates the excavation area. The progress of work is explained below and typifies all alleys in Phase 3.







1. Looking up the alley from substation end before excavation and after set up of alley.



2. Looking down the alley from the other end before excavation and after set up of alley.





1 Excavation of alley with 550 dozer and dust control done from the outside of zone.



Pushing hazardous waste soil to one end of alley so it can be loaded out. Site muddy due to rain the night before.



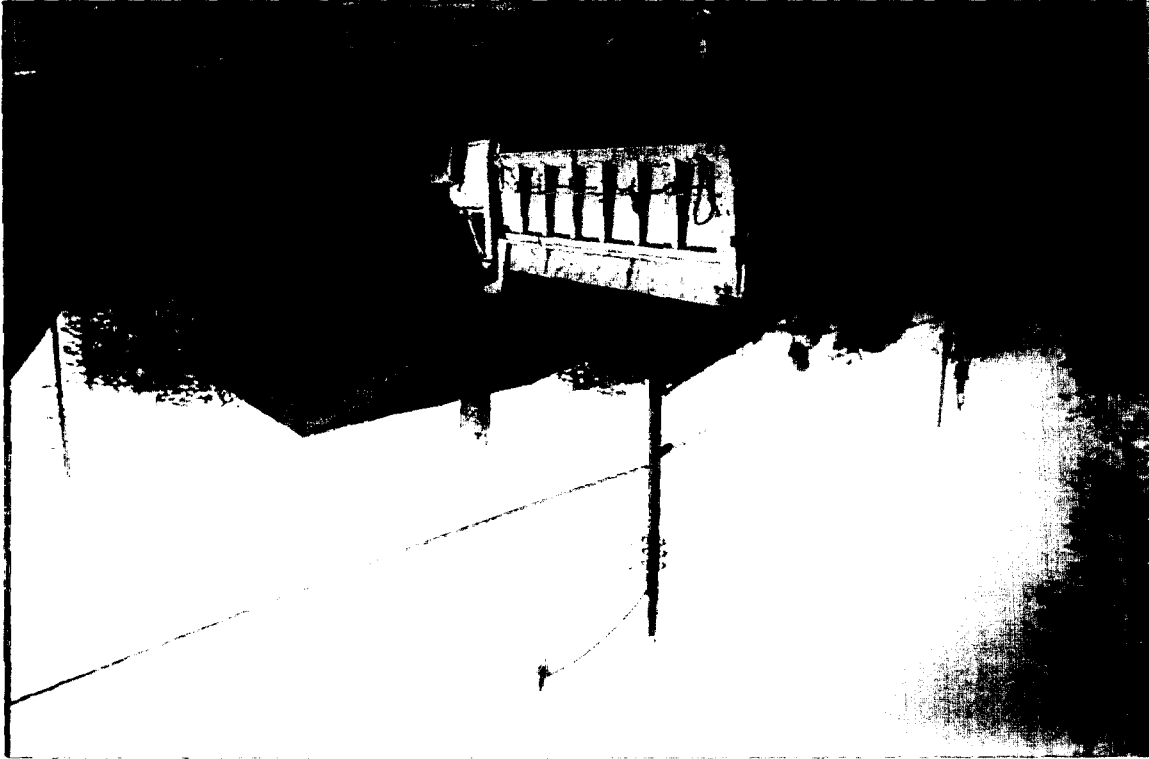


Project 13-1-12  
Final Report  
March 27, 1986

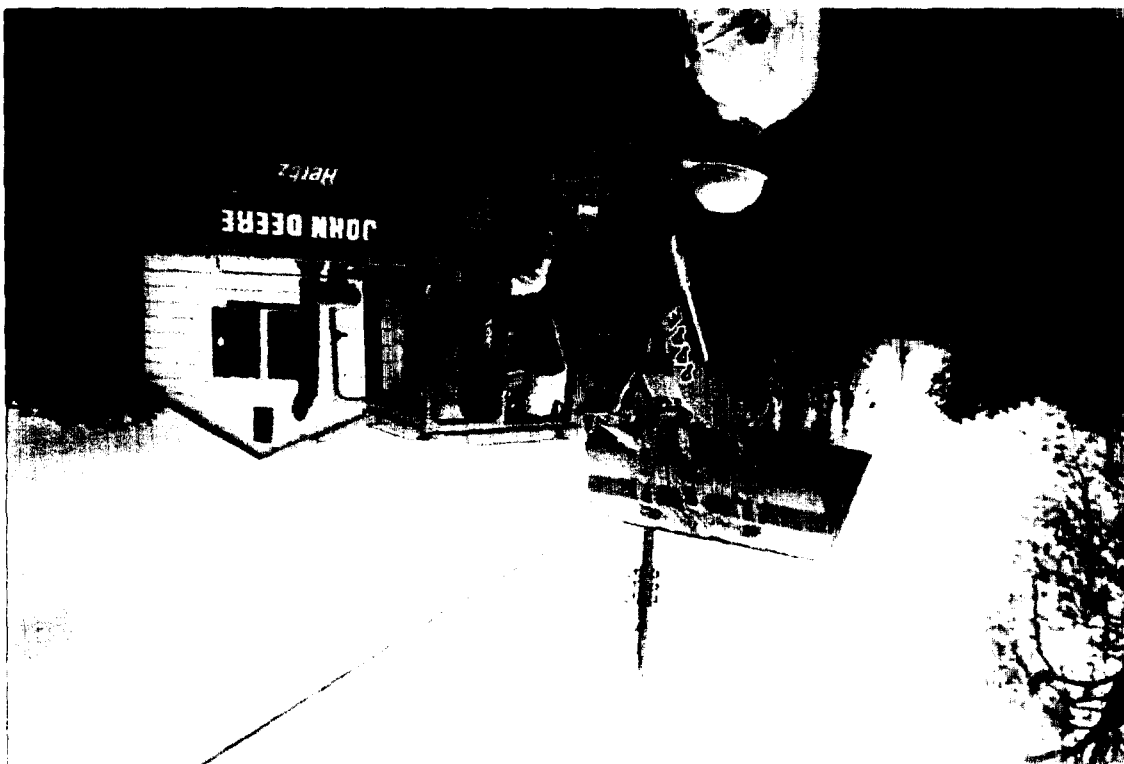
5-5

1. The purpose of this study was to determine the feasibility of using a mobile hazardous waste stabilization unit to treat hazardous waste at the site of the accident. The study was conducted by the EPA and the U.S. Army Corps of Engineers. The results of the study are presented in this report.

2. O-M personnel turning truck before taking hazardous waste soil to stabilization pen.



3. Back Loader loading hazardous waste soil onto truck.





Alley excavated.



3. Alley after stone was compacted and the tar and chip work was completed.





9. Alley after stone was compacted and the tar and chip work was completed.





## 9.2 TYPICAL HAZARDOUS RESIDENCE - 101 CARVER

The 101 Carver site displays the excavation of hazardous materials from residential sites. The non-typical portion of this lot was placement of geotextile liner to cover the landfill debris found after original excavation depth. Otherwise, this site typifies Phase 1 work.





1 Hand excavation around building.



2 Front yard excavated stockpiling soil at the rear of the lot.







3. Geotextile liner over landfill with clay stockpiled for cap.



4. Final grading complete and sod being installed.





5 Munie Outdoor Construction watering after they installed sod.



### 9.3 TYPICAL NONHAZARDOUS RESIDENCE - 1444 GRAND

The 1444 Grand site was a typical stack emissions lot showing progress from start to finish. This site typifies work for Phase 2.





1. Equipment staged on site over Christmas break, before the excavation started.



2. Front of lot being excavated.





3. Topsoil being spread over backfill soil and final grading



4. Not solid 100%. City sidewalk broken during restoration being replaced.





1. Installation of geotextile liner, Geo Woven fabric, and CA-6 stone during the construction of the stabilization pad.

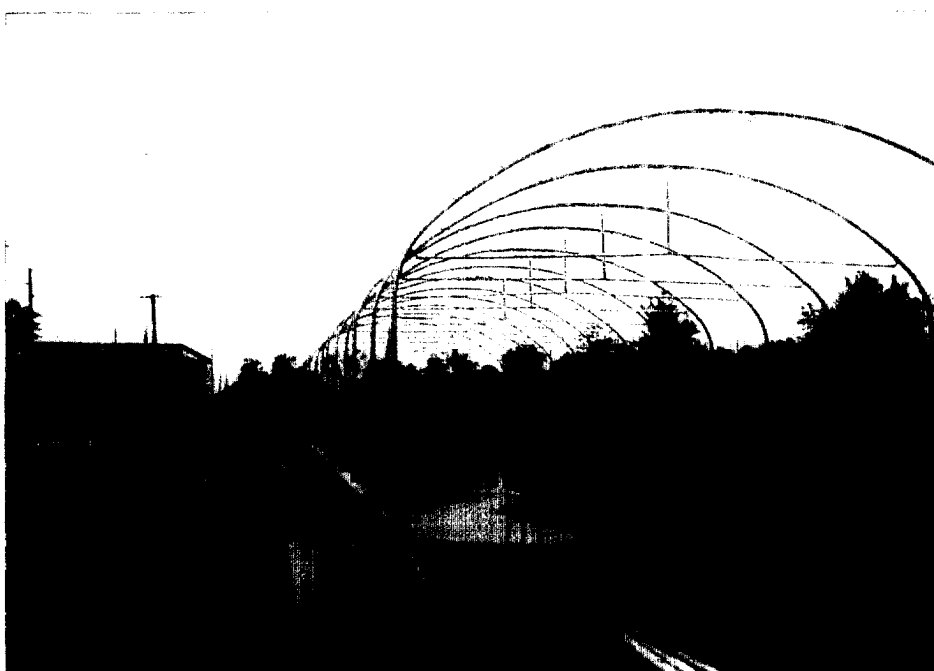


2. Subcontractor installing asphalt pad and berms for stabilization process equipment.



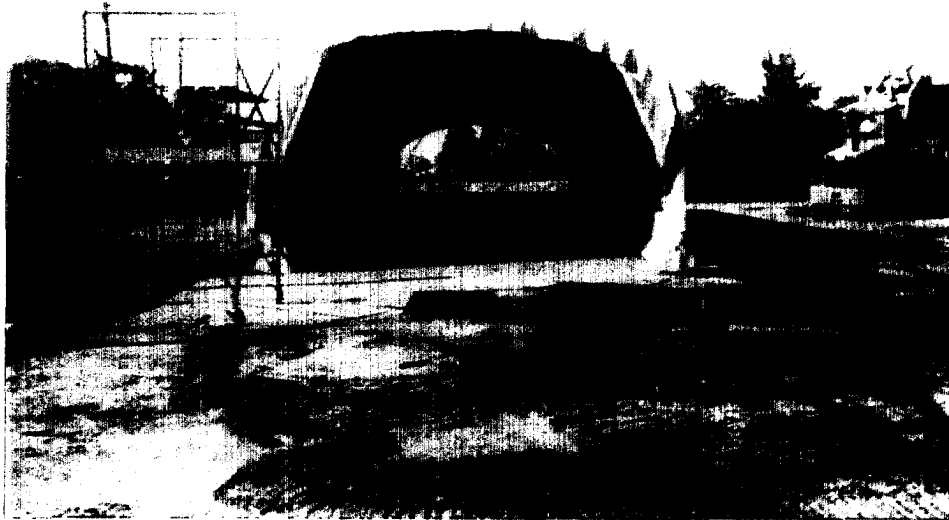


3. The 50,000 gallon pools for water storage; one on the hazardous side and one on the treated waste side.



4. Beginning construction of storage building.





5. Building that was erected for the storage of hazardous soils.



6. Installation of sump on the hazardous side of pad to contain rain water and act as a pumping station.







7. Sump completed before asphalt was installed around sump.



8. Crusher set up and running pilot test for hazardous slag pile.



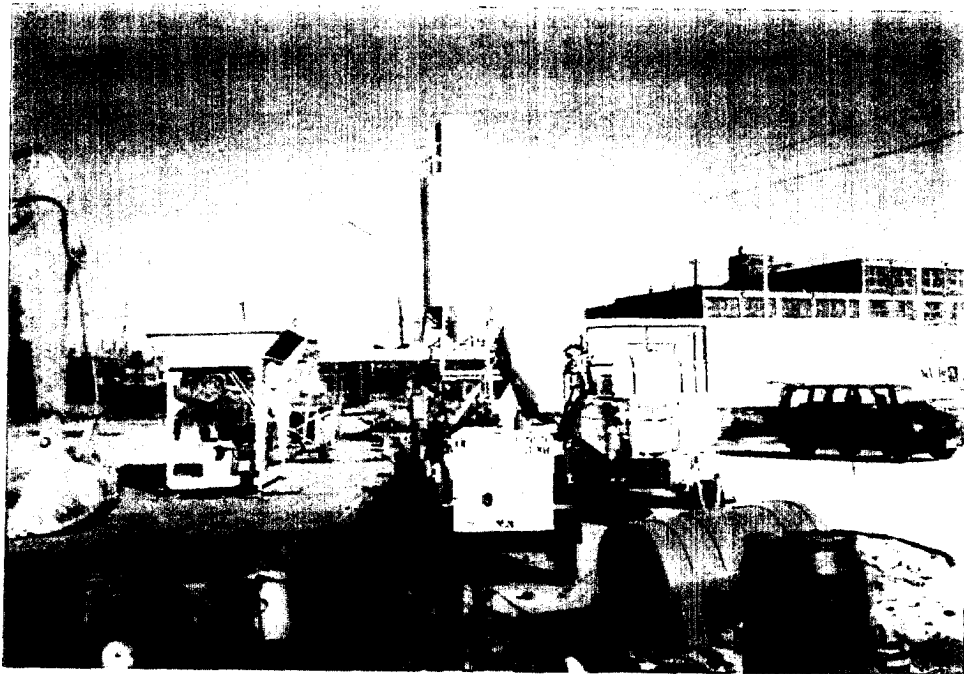


9. 644 Loader stockpiling for the trackhoe. PC220 Trackhoe running hazardous soils through power screen unit.



10. Overhead view of hazardous side of pugmill site.





11. Process equipment in place to begin.

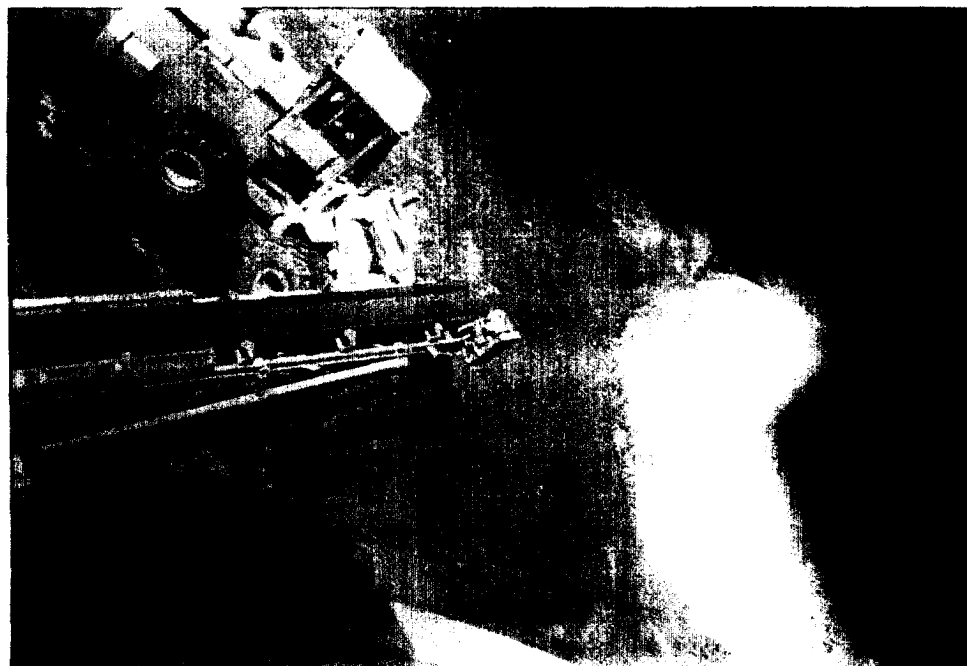


12. Belt feeder delivering hazardous soil at a consistent flow to the pugmill.





13. Hazardous soil, reagent, and water being mixed within the pugmill.



14. 644 Loader stockpiling treated soil from the discharge conveyor of the pugmill.





15. The 100-ton stockpiles of treated soil awaiting sampling for disposal.

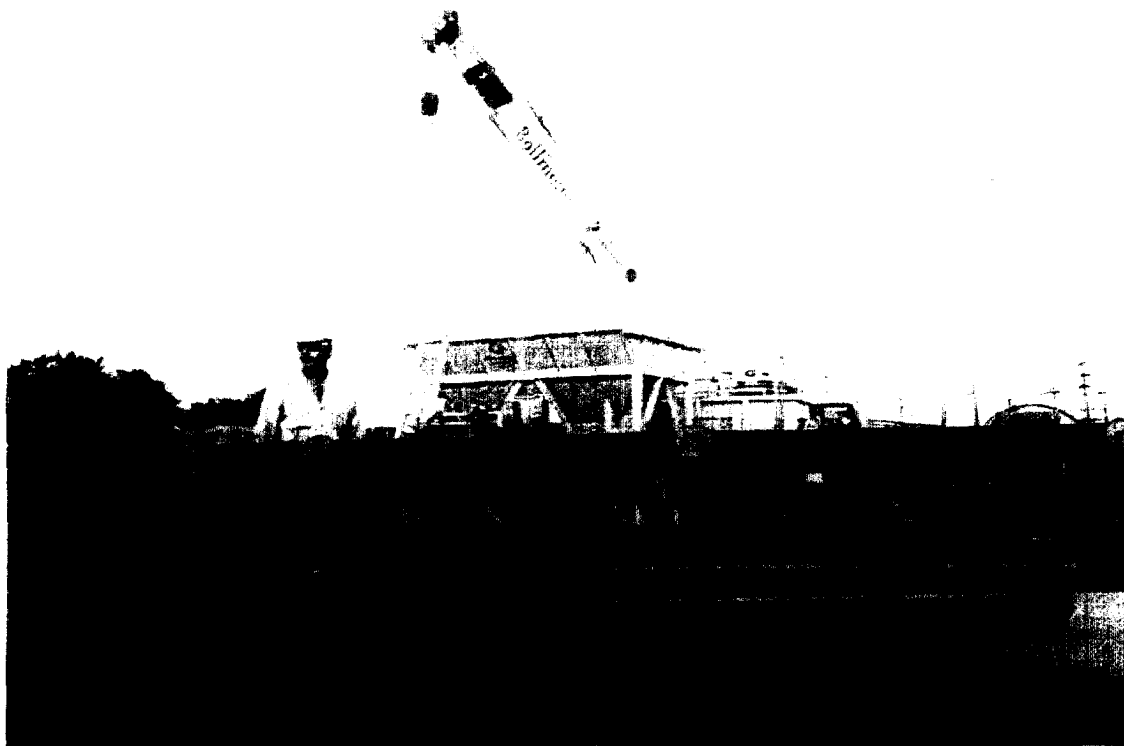


16. Recovery techs using foam seal product to shield stockpiles from weather (wind, rain, etc.)





17. Cunningham Trucks hauling treated soil to Laidlaw, Roxanna.



18. Bollmeier Crane used to load pugmill equipment after the equipment has been decontaminated.





19. Recovery technician using a power washer to gross decontaminate hazardous side of stabilization pad.

